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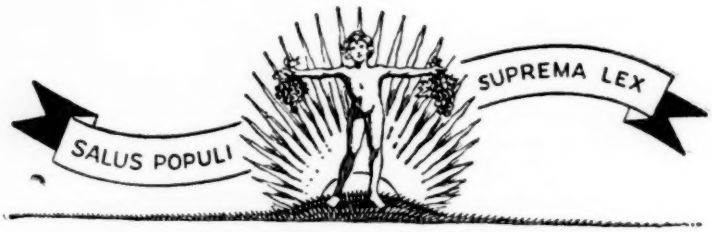

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An Address

ON THE

FUTURE OF OBSTETRICAL PRACTICE.

Being the Presidential Address delivered before the Obstetrical Section of the Third Australasian Medical Congress, at Sydney on Sept. 5th, 1929,

BY HENRY JELLETT, M.D. DUB., F.R.C.P. IREL.,

PRESIDENT OF THE SECTION; CONSULTING OBSTETRICIAN TO THE HEALTH DEPARTMENT OF NEW ZEALAND; FORMERLY MASTER OF THE ROTUNDA HOSPITAL.

THE art of midwifery has passed through many stages. Originally it may be assumed that women delivered themselves of their children, as do wild animals, and with as little danger to themselves. Gradually, occasional difficulties introduced themselves, and in response to them elementary methods of assistance were devised. Difficulties increased, and methods of assistance became more developed. Greater use was made of the methods evolved, and, as a result, new difficulties and dangers appeared. Human life became more complicated, its relations more crowded and artificial, and pre-existing disease became more common. The mechanical complications of labour became greater and the need for assistance more frequent. To the ordinary risks were added risks of blood infections brought by those whose object was to assist, with the probable result that efforts, made to reduce the risk of labour, instead multiplied that risk. There can be little doubt that maternal mortality before the time of Semmelweiss was considerably greater than it would have been if every woman had been left unaided. There is even a certain element of possibility that, in the case of the healthy woman, this is still so. In the past interference during labour was limited, and asepsis was unknown. In the present, interference is frequent and asepsis is occasional. In the future, if the rate of maternal mortality is to be brought to the minimum, it will be necessary to reverse this relationship. Interference must so far as possible be avoided, and asepsis must be positive.

THE ESSENTIAL AIMS OF MIDWIFERY.

The art of midwifery has been devised with three aims before it, and it is being slowly perfected. The first is to bring a mother safely through a normal pregnancy, labour, and puerperium. The second is to ensure the delivery of a healthy infant. The third is to leave the mother in as normal a condition at the end of the puerperium as she was at the beginning of the pregnancy. Similarly, there are three basic essentials on which this art is built—knowledge, skill, and suitable environment. Knowledge is necessary to avoid both complications and interference, and to treat the one and to regulate the other should it become inevitable. Skill is necessary to obtain the fruits of knowledge. Suitable environment, by which I mean the circumstances under which a labour takes place, is necessary in order that the normal and abnormal events of labour may be conducted in an orderly and aseptic manner.

If these three essentials can be obtained, then the risks of childbirth will be reduced to their lowest. If they are absent, or if the possession of a due share of one is allowed to count as an equivalent to the absence of another, then the whole structure falls. Under such circumstances, as I have already suggested, it is quite possible that, so far as the rate of mortality is concerned, humanity as a whole would be just as well off without it, although individuals might still benefit.

Are these essentials obtainable? I think they are, at any rate to a much greater extent than is the case at present. But, before we shall get them, it will be necessary to throw aside a number of hampering ideas. The position of midwifery in the curriculum of the student, if judged by after consequences, is not and cannot remain inferior to that of medicine or surgery. Even if in the past the medical quack ranked before the surgical barber, and both before the "midwife"—male or female, the fact remains that to-day the badly taught "midwife" can kill more than the highly educated physician can cure, and that a good working knowledge of the art of surgery does not always make the surgeon more successful. If actual results are to be the criterion of relative importance, then I venture to suggest that the results of the obstetrical art, properly practised, are at least as important, though less brilliant, than those of medicine and surgery.

Then there is the public ignorance of the essentials of midwifery—an ignorance which takes many forms. There is one form which places the presence of a medical practitioner and prompt action before everything else, and which drives the practitioner into acts repellant to him. There is another form which decries the efforts of the practitioner to obtain an environment that will make asepsis possible, and which grudges the small incidental expense necessary. There is another form which considers that a medical practitioner is well paid for his skill, his time, and his assistance during pregnancy and labour, by a fee far lower than would be paid for a minor operation of general surgery.

It is popular to speak and to write as if medical science sprang yearly from one step to another, and that each step formed a permanent and desirable advance towards the top storey of knowledge. This may be so in medicine, but it is not the case in the art of midwifery. It is now just 30 years since the first edition of my small midwifery was published. It contained the teachings of Sir William Smyly. It contained the statistics of the Rotunda Hospital during his and during the first year of Dr. Purefoy's Masterships. It is of interest to note their treatment of the major complications of pregnancy and labour—sepsis, hæmorrhages, eclampsia—and to examine their results.

The aseptic technique of Sir William Smyly was far ahead of that of the average private hospital of the present day. The treatment of puerperal infection was no more unsatisfactory. The treatment of the hæmorrhages of pregnancy and labour was practically identical with that which is now generally accepted, although at the time students were threatened with rejection at their examination if they mentioned it! The treatment of eclampsia had not been placed on the firm basis on which Tweedy and Stroganoff have since placed it, but it was superior to that too often adopted to-day in private practice.

As for the general results, the following figures will show them. During the five years ending 1898, 7068 women were confined in the hospital. The total mortality was 22—that is, at the rate of 3·1 per 1000, including abortions.

Candidly, if we exclude the recognition of the necessity for a more rigid aseptic technique, I do not know of any very marked advance since the time to which I allude except the introduction of antenatal care. We seem to run after methods—principally operative methods, and to neglect men—and women. We are eternally looking for new advances—advances that must be built on knowledge, and neglecting the foundation on which that knowledge must be built. We create hospitals which make interference with normal labour easy, and we neglect the essentials which make interference safe, and the teaching which makes it unnecessary. We make medical practitioners and midwives, but we fail to provide them with a sufficient knowledge of midwifery. If it is true that in countries other than the British Empire, and even in some parts of the British Empire, the recognition of correct principles and practices has solved the question at which we stumble, then let us not rest content until they have become the principles and practices of the British Empire. The present system of caring for the pregnant and the lying-in woman is essentially

wrong; I propose to show that by the adoption of a different system it is possible roughly to halve the present rate of maternal mortality.

Cardinal Factors in Control of Mortality.

I wish to draw your attention to certain factors in the management of maternity, the connexion of which with maternal mortality is so obvious that I think it is permissible to regard them as the cardinal factors which control the rate of that mortality. The first of these is the nature of what, for the sake of convenience, I shall call the midwifery attendant, that is, the person who is directly responsible, either in part or in whole, for the care of the pregnant and lying-in woman. The second is the skill and knowledge possessed by that attendant. The third is the degree of antenatal care and antenatal diagnosis which each woman receives. The fourth is her environment during labour.

If we could go back several centuries and examine the history of maternity at that time we should probably find that none of these things received any practical attention or even recognition. Further, we should probably find that while the mortality accompanying normal pregnancy and labour was very low, the mortality accompanying abnormal pregnancy and labour was very high. If, however, we go back only 50 years or so and again examine we shall find that, while some importance was attached to the nature of the midwifery attendant and to the degree of skill and knowledge possessed by him, little attention was paid to antenatal care or to the environment of the patient. The maternal mortality of the period was probably far higher in the case of the normal woman than it has been several centuries before, while in the case of the abnormal woman it was certainly far less. Finally, if we take the present time, we shall find that, while full recognition is given in theory to all four factors, in practice they are either erroneously interpreted or overlooked, and that the resulting mortality in both types of case is probably very similar to what it was 50 years before. In fact, I am afraid that an unprejudiced investigator, with all the facts before him, would be driven to the conclusion that the basis of modern midwifery practice was as unstable as it had ever been, and that the edifice reared on it was so shaky as to be unsafe.

The Present System of Maternal Care.

What is this edifice? Broadly I may put it something like this. A woman discovers she is pregnant. She discusses the matter with her friends, who advise her to do diverse things. After an interval of some months she interviews a medical practitioner and engages him for her confinement. It is the only part of the whole procedure with which she thinks he is concerned. He writes down her name and the probable date of her confinement. He perhaps recommends a nurse, only to find that she has already engaged one. Patient and doctor mutually forget each other's existence until about the onset of the second stage of labour, or, in a primipara, perhaps later. The doctor is then summoned. If immediate delivery is not imminent, he is expected to produce it by the usual means, and often does so. He visits the patient during the puerperium and then leaves her. Finally, he is paid a fee which, while it may have some relation to the services rendered, has no relation whatever to services which ought to have been rendered.

There are a few more details to be added. The education of the practitioner in obstetrical matters may have been sound and thorough. On the other hand, it is likely to have been so cramped by the exigencies of the other parts of his medical curriculum as to bear no relation to the responsibilities he has got to discharge. Similarly, the education of the nurse may have been sufficient. On the other hand, it may have been so incomplete as to make it unsafe to trust her even with the sterilisation of the practitioner's instruments. The environment of the patient during labour, by which I mean the various conditions which render the carrying out of asepsis and the prompt treatment of obstetrical emergencies possible or impossible, may be as good as those surrounding a minor surgical operation, or so bad that no one with a surgical conscience would care to attempt one.

Everyone—patient, relations, nurse, and doctor—may be in haste, and the chance of a normal labour reaching a normal termination be very small. Further, the practitioner, through no fault of his, may have been obliged to come directly to his patient from a case of a septic nature. The puerperium follows, and the patient lies in bed for perhaps 8, 10, 14 days, or even for longer. Her active movements are often discouraged, and the idea of her leaving bed is sometimes viewed with horror. Finally, there is no effective postnatal examination or care.

Is my description exaggerated? Let me put the matter in the form of question and answer.

What is the chief essential in the management of normal pregnancy and in the prevention of abnormal pregnancy?—I answer—antenatal care.

What are the chief essentials in the management of normal labour?—Absence of haste and asepsis.

What is the chief essential in the prevention of abnormal labour?—Antenatal diagnosis.

What are the chief essentials in the treatment of abnormal labour?—Asepsis and operative facilities.

Are these essentials usually present in the average case of maternity as conducted in the present time?—I do not think they are.

Hence my opinion that the cardinal factors which control maternal mortality are erroneously interpreted, and that, this being so, the present system of caring for the puerperal woman is wrong.

A Comparison of Results.

I want to bring to your notice certain statistics which show the relative rates of maternal mortality in different parts of the world, and in one section of these parts. In each case the figures cover a period of six years ending 1927.

Countries.	Number of live births.	Total deaths.	Death-rate per 1000 live births.
Great Britain, Ireland, Australia, New Zealand	6,050,532	26,506	4·22
Australia	676,599	3,522	5·21
New Zealand	169,494	821	4·87
Holland and the Scandinavian countries ..	2,064,526	5,220	2·53
Holland alone	1,081,096	2,809	2·59
Queen Victoria's Jubilee Institute	317,758 (labour)	524	1·41

It will be seen at a glance that these figures fall into two groups. There is first a group in which the death-rate is relatively high, and which includes both all that area of the British Empire which I am considering, and also its component parts. Secondly, there is a group in which the death-rate is markedly lower. It includes Holland and the Scandinavian countries. As a connecting link between the two, and as a proof that the cause of the difference is not racial, I add the statistics of a sub-group of the British Empire, which shows a very low mortality. If the views I have expressed above are correct, we should find that the practice of obstetrics in Holland and the Scandinavian countries rests on a wholly different basis to that on which it rests in the British Empire.

Analysis of the Four Factors.

I now propose to analyse the differences which exist between the two groups in respect of the four cardinal factors that control maternal mortality.

1. *The Nature of the Midwifery Attendant.*

I think I am right in saying that, in the British Empire, as I have limited it, the majority of women are attended in labour by medical practitioners. In Holland and the Scandinavian countries, and under

the care of the Queen Victoria's Jubilee Institute, all normal cases of labour are attended by midwives. Here, then, is a very marked difference. Is it a vital one? Personally I think that it is, and I will go into my reasons for so thinking. There are three types of midwifery attendant to whom the care of the normal lying-in woman can be entrusted—the obstetrical specialist, the general practitioner, and the midwife. If I am right in thinking that the chief essentials of the management of normal labour are asepsis and the avoidance of interference, the specialists and the midwife are in a better position than is the general practitioner. Both can give, or ought to be able to give, the necessary time and need not to be driven by the exigencies of general practice to shorten the labour to the injury of the patient. For the midwife it is, or ought to be, a matter of one patient at a time. For the specialist his fee is, or ought to be, sufficient to enable him to give all the time that is wanted.

The position of the general practitioner is different. In the day-time the demands of general practice press on him, as well as those of midwifery. At night he must get some sleep if he is to carry out his work. The natural and practically unavoidable result is that he comes to a case of midwifery in a hurry, and that the two essentials of midwifery—asepsis and the avoidance of interference—are crowded out. Again, he is in constant contact with infection of different kinds, and no matter how carefully he may try to remove its effects it is not always possible for him to do so. If the specialist comes into contact with infection in the course of gynæcological practice he can find a substitute to replace him temporarily. The specialist, however, we may put aside. The real issue is between the general practitioner and the midwife, and the midwife has neither the need nor the right to come into contact with outside infection, nor having done so, to attend another patient until she is again safe. The septic death-rate amongst over 300,000 patients of the Queen Victoria's Jubilee Institute was 0·33 per 1000, and in Holland it was 0·77 per 1000. During the same period in England and Wales it was 1·46 per 1000. In Australia it was 1·7. In Ireland it was 1·79. In New Zealand and in Scotland it was 1·82. That is to say, the septic death-rate amongst women mostly attended by the medical profession was from something more than four to something less than six times greater than amongst women attended wholly by nurses. This being so, it would seem to be apparent that on the grounds of freedom from sepsis alone the care of the normal woman by the midwife, as opposed to the practitioner, is clearly indicated. Further, it is obvious that the other dangers of pregnancy and of normal labour are not increased thereby, seeing that in Holland they account for 1·82 of the total mortality, and amongst the patients of the Queen Victoria's Jubilee Institute for 1·07, while in England and Wales they account for 2·5, and in Australia for 3·51.

Here, then, is a very marked difference between low mortality and high mortality countries in regard to my first cardinal factor—the nature of the medical attendant. Accordingly, I am going to suggest that the midwife is the proper person to conduct normal labours. To support this suggestion I give from the point of view of the patient the statistics I have already quoted. From the point of view of the medical profession I advance the further suggestion that, to comply with the legitimate demands of present-day midwifery and to accept its customary remuneration, means that the medical practitioner must be a philanthropist—not by wish but by compulsion, and not on occasions but all the time. Whether such an occupation is compatible with the financial and domestic necessities of a professional individual is for each individual to answer for himself. My own view is that, when the time comes that all normal cases are handed over to midwives, the medical practitioner will wonder how he stood for so long a servitude under which his night was converted into day, his work into toil, and his obstetrical conscience into a nightmare.

2. *The Degree of Skill and Knowledge Possessed by the Attendant.*

Here, again, we find the most striking differences between the practice of the British Empire and of Holland in regard to the education of both the student and the midwife. I will select for contrast the training of the medical student which prevailed at Otago University, New Zealand, up to the end of 1927 and the similar training at Utrecht University. In each case the total length of the medical course is six years.

In the *Otago* University the course is as follows:—Fifth year: Attendance on a course of 50 theoretical lectures. Fifth and sixth years: Attendance on at least 20 midwifery cases, of which at least four shall have been attended under proper supervision at a maternity hospital. Twelve attendances at the antenatal clinic. Attendance at the University Maternity Hospital, which has 16 beds, when called on for practical instruction in cases of difficult labour. Each student attends approximately six abnormal labours. Attendance on 12 clinical lectures delivered by the University tutor.

In the *Utrecht* University the course is as follows:—Second year: Two hours weekly of theoretical instruction in midwifery and demonstrations on the phantom. Third year: Three hours weekly of similar instruction. Fourth year: Ten hours weekly of similar instruction. The student then passes an examination in theoretical midwifery. Fifth and sixth years the work is as follows: Eight hours weekly of special instruction in practical obstetrics. Six-week dressership in the University Midwifery Hospital, of which two are spent in residence. One month as extern accoucheur working on the district. The standard of practical work is 50 antenatal examinations and 40 conductions (not attendances).

In the training of midwives a similar difference is apparent though it is not so marked. In New Zealand the course for women without general training is 16 months. In Holland it is three years. I select New Zealand for comparison because the facts are before me, and not because it serves to emphasise the differences. As a matter of fact its course for medical students was at that time, and probably still is, inferior to the corresponding course in Great Britain, owing to circumstances which are at present difficult to control. On the other hand, its training of midwives is considerably better than the average training of midwives as laid down by the Central Midwives Board of England and Wales. A similar remark applies to the nurses of the Queen Victoria's Jubilee Institute who, so far as I understand, have all received a general training and who have received their midwifery training in recognised maternity hospitals.

The essential duties of the medical practitioner in maternity work are to be found in the prevention and treatment of obstetrical disease and anomaly. If his education does not fit him to discharge them, then his services towards the prevention of maternal mortality are very small. Further, if the management of normal cases is to be given to midwives, it is obvious that the present system which prevails in Great Britain, whereby one midwife can be almost wholly trained by another midwife, must become a thing of the past, and that even the more advanced training given in New Zealand is not sufficient.

3. *Antenatal Care and Diagnosis.*

This, again, is a factor of vital importance, and one which in regard to antenatal care is partly, and in regard to antenatal diagnosis is wholly, an essential duty of the medical profession. To emphasise this importance in the case of antenatal care it is only necessary to refer to its effect on the incidence of eclampsia. The patients of the Queen Victoria's Jubilee Institute receive antenatal care, and the mortality of eclampsia amongst them was 0·16 per 1000 deliveries. In New Zealand during the same period the mortality was 1·16 per 1000 live births.

Statistics of the work of a maternity hospital collected by Ray and laid before a Conference on Maternal Mortality and Morbidity in 1928 show that, before antenatal work was systematised, there were ten deaths from eclampsia amongst 16,565 patients. After it was systematised there was one death from

eclampsia amongst 13,067 patients. At the East End Maternity Home amongst 4173 patients there was not a single case of eclampsia. On the other hand, the attendances at the antenatal clinic numbered 11,881.

The only positive figures which I can place before you to show the effect of antenatal diagnosis on the prevention and prognosis of difficult labour are as follows. In England and Wales the death-rate from the "other accidents of labour" and from hæmorrhage was in the statistics from which I have already quoted 0·96 per 1000 live births, in Australia it was 1·22, in New Zealand it was 0·98. The corresponding death-rate amongst the patients of the Queen Victoria's Jubilee Institute was 0·33 per 1000 labours. That is to say, it was approximately a third of that of England and Wales and of New Zealand, and slightly more than a fourth that of Australia. I think that if you will recall the appalling consequences of undiagnosed and improperly treated contracted pelvis and particularly of the minor degrees of contraction, with its sequelæ failed forceps, failed craniotomy, delayed Cæsarean section, and septic infection, you will be able to estimate the effect of careful antenatal diagnosis yourself.

I have already suggested that the medical profession should give up the care of normal labour to midwives. I now suggest that they should replace this irksome and in every sense of the word unprofitable task by careful antenatal care and diagnosis, effective assistance in abnormal labour, and sufficient postnatal care. I quite recognise that many practitioners are trying and have tried for some years to give such care, in spite of the fact that the considerably increased demand it makes on their time goes unrewarded. Still the fact remains that, whereas in Holland every mother comes under the care of a medical practitioner during labour, in the British Empire it is only the minority who do so. Antenatal care and diagnosis is capable of removing almost completely the graver dangers of eclampsia and of obstructed labour by preventing the occurrence of the one and by the anticipation of the other. If it did nothing more than this it would probably reduce the maternal mortality-rate by something between 1 and 1·5 per 1000 births.

4. *Suitable Environment.*

I have explained what I intend to convey by this term—namely, everything which tends to promote the practice of asepsis, and which makes necessary intervention in obstetrical emergencies easily accomplished. I have no means of judging whether the environment of labour is better in Holland than in the British Empire, and so I will assume that it is the sole cardinal factor in which the practice of the two countries does not materially differ. Still its importance is such that I must discuss it. The value of suitable environment varies theoretically according to the circumstances and nature of the case. Thus, in a normal confinement normally managed in a private house, environment is possibly of small importance. Intervention is, and even vaginal examination may be, unnecessary. Consequently the risk of infection is small. In hospitals, public or private, environment is all-important on account of the increased risk of infection due to the presence of other patients. In abnormal cases, whether in private houses or in hospitals, environment is again all-important. So much in theory is probably right. In practice, however, seeing that unexpected complications may occur and necessitate intervention, suitable environment is always necessary.

The details of a suitable environment are all-important, but it is impossible to do more than touch on them. The aseptic environment must be such as to enable the labour to be carried out with the same degree of asepsis as is a surgical operation. It is strange that the truth of the fact is still unrecognised, and even contested, by so many people, and that it is possible to find a medical man removing tonsils in the morning with the strictest aseptic ritual and a placenta in the evening with none. Yet the removal of a placenta is possibly the operation most fraught with septic possibilities of any in the whole field of medicine. I am sure that the defence to this will be that the surroundings of an average case of labour make asepsis impossible. My reply is that we, as a profession, have had some 50 years at least in which to teach nurses and the public that these surroundings must be changed, and that we have not done so. Even at the present time, when a technique, which makes asepsis possible amidst bad surroundings, has been worked out in a satisfactory manner, medical practitioners are to be found who decry it as a useless and unnecessary expense and complication. Consequently environment does not improve, and the responsibility rests with us.

A very similar remark may be made regarding the environment which makes the treatment of obstetrical emergencies easy and safe. How many practitioners insist that the patient's room shall be so arranged that if, for example, postpartum hæmorrhage should occur, its treatment can be immediate and effective? I am almost afraid to ask the next question. How many practitioners carry with them the necessary appliances for its treatment, and prepare them beforehand so that they may be ready for an emergency? And yet the sole excuse for the presence of a medical practitioner during normal labour is that he is available for the treatment of the unforseen complication. Otherwise he is only an additional source of danger.

Again, the environment in private maternity hospitals is often no better than in a private home. And yet it is generally recognised that such hospitals are a danger rather than a benefit unless improved asepsis and general facilities more than compensate for the increased danger caused by the aggregation of patients.

Circumstances have made Labour Pathological.

Someone may suggest, as has been so often suggested before, that it is absurd to worry about environment, and to treat as pathological what is a normal physiological function. This is a confusion of ideas, and one which in the past has helped to increase maternal mortality. It is true that the process of labour under normal circumstances is a physiological one, but the circumstances which surround it in civilisation are so far from normal that it has become pathological. I ask the question in all seriousness. Is there a single incident in the management of normal labour which is not opposed to the physiological process of labour? Candidly I cannot discern one which is not opposed to it in some manner. Let me compare the course which I think Nature will prompt a woman to follow during labour with the cause which civilisation has imposed on her. I fancy that a cave-dweller's labour was somewhat as follows.

The Cave-dweller's Labour.

The woman washes herself at a nearby spring or stream, and she walks about and does some of her daily work during the first stage. There is no hip-bath in which she sits, there are no examinations or other interferences. The second stage comes on. She squats during the pains in an attitude of defæcation, thus enlarging her pelvic outlet, and gaining the help of gravitation on the descent of the child, and effectively using her abdominal muscles. The child is born, and the cord is either divided or left while the woman, still in a squatty position, expels the placenta. There is no question here of vaginal retention. If there is any delay, she hugs tightly a large stone, using it, together with her voluntary efforts, as a means of increasing intra-abdominal pressure. Then she probably lies down for a time, shortly to get up again to make the cave equivalent of a cup of tea. During the puerperium she is mostly on her feet. There is free drainage from the vagina, and, when she suckles her child, uterine action expels the lochia from the uterus. Her posture during labour and the puerperium causes a flow from the uterus to

the vagina and thence externally. There is no opportunity for its reversal, and the aspiration of fluids from the vulva and the vagina cannot occur.

Civilised Labour.

The labour of her sister in civilisation is a very different matter. She enters a nursing home for her confinement, and begins her opportunities of infection by sitting in water in a bath which has just been used by another patient. Her vaginal orifice is somewhat patulous and water enters freely. She is then examined vaginally to see that all is normal, and later, perhaps a second or third time, to see if the doctor must be sent for. She has been sent to bed early in the first stage, and her position and mental anxiety make labour tedious. The nurse thinks it is getting too slow, so she presses on the fundus to try to hasten the expulsion of the child. The uterus is pressed down into the pelvis, and, when the pressure is relaxed, it rises again, and there is some vaginal aspiration which sucks into the vagina any fluid lying near the orifice. Such fluid has been infected by an unsterilised "wipe," and so more bacteria gain entrance.

The first stage continues, the patient is crying from nervousness and unrelieved pain, and so the medical attendant is summoned. He examines again and finds nothing wrong, so he is wise enough to give her a sedative and to wait. The moment, however, she comes into the second stage the forceps is applied. In a way she is a lucky woman, because it might have been applied during the first stage.

Where does the physiological process of labour come into this radical mismanagement? To begin with, civilisation forced the woman to have her baby in an abnormal attitude and in the confined circumstances of a nursing home, instead of in a normal attitude in an open space. Then her nurse sent her to bed when Nature wanted her to walk about. Then her doctor extracted her baby with forceps, when she would have delivered it herself if she had been allowed. Lastly, he extracted the placenta when Nature would have expelled it if the patient's attitude had not prevented her. Then civilisation again made her lie on her back or side in bed, while the normal discharges of the puerperium collected in the upper part of the vagina, and the septic organisms which had entered found both a medium in which to develop and an incubator to help development.

I submit that when a natural process has been diverted from the normal, to the extent that the labour of civilisation has been diverted from the labour of nature, it becomes to all intents and purposes a pathological process for which it is necessary to try continually to find new remedies, of which a perfect environment is one.

It is thus evident that current practice in regard to three out of the four cardinal factors I have mentioned differs markedly in the British Empire and in the group of low mortality countries. It is also clear that so far as the Queen Victoria's Jubilee Institute is concerned, the recognition of these factors is followed by an even greater drop in maternal mortality than occurs in Holland.

Apparent Everyday Causes of Maternal Mortality.

I have certain definite ideas in regard both to the causes of maternal mortality and the ways by which it can be prevented. They are the result of my experience during the last five years or so as obstetrical consultant to the Health Department of New Zealand, and of the study of the writings of others on the subject both in Great Britain and in Australia. I express my indebtedness for both information and suggestion to Dame Janet Campbell and Dr. J. S. Fairbairn at home, to Dr. Marshall Allan and Dr. Sydney Morris in Australia, and to Dr. Sydney Allen in New Zealand. I believe that the practical causes of an unduly high maternal mortality, that is to say, the causes which are removable and whose removal will effect a marked reduction in such mortality, are as follows:

1. The conduction of normal labour by medical practitioners, because the latter of necessity bring to the case the dangerous elements of haste, of unnecessary interference, and of sepsis.

2. The insufficient medical education of both medical practitioners and midwives. In the case of the former the consequence is an insufficient skill to deal with the obstetrical diseases and difficulties which are their special province. In the case of the latter the consequences are an insufficient knowledge to enable them to appreciate the importance of and to practise a rigid aseptic technique, and, to a less degree, to make the general management of their patients inadequate.

3. The lack of due attention to antenatal care and antenatal diagnosis. The failure of the former results in unnecessary deaths from toxæmia, from pre-existing septic infection and from antepartum hæmorrhage. The failure of the latter results in unnecessary deaths from difficult labour and its sequelæ.

4. Unsuitable environment leading in maternity hospitals to deaths from septic infection acquired from other patients, and in private houses to deaths due to inability properly to treat obstetrical emergencies and to a less extent septic infection.

I trust no one will suggest that in expressing these opinions I am attacking the medical profession. If anyone should do so, my best answer is that, if so, I am attacking myself too. I am sure that, when I was Master of the Rotunda, the only one of the four causes which I have given above, and to which I attached sufficient importance, was the second—namely, adequate obstetrical education, and possibly also the fourth—suitable environment. The other aspects of the matter had not occurred to me, although they should have been obvious. I can only hope that soon they will represent the collective opinion of the medical profession.

The remedy suggests itself. Free the medical profession from what I have called the servitude of normal midwifery. Give the medical student sound and practical instruction in midwifery, and imbue him with the belief that one of his duties in life is to keep on adding to her knowledge. Teach the practitioner that his part in midwifery is antenatal care and diagnosis, the management of abnormal labour and of the abnormal puerperium, and postnatal care. Teach him, too, that amongst his patients he is an obstetrical parson, and that his text is the necessity for early medical advice and for suitable environment. Lastly, reform private maternity hospitals so that their environment may be that of a true hospital rather than of a lodging-house, or even of a private hotel.

I have quoted the statistics of the Queen Victoria's Jubilee Institute a number of times, and I will quote them once again. The total death-rate amongst its patients during a period of six years was two-fifths that of the obstetrical death-rate of the British Empire during the same period. If these figures are adjusted to make them more strictly comparable with official statistics, the death-rate per 1000 live births amongst the patients of the Institute was approximately one-third that of the Empire figures, while the unadjusted septic death-rate is less than one-third. Surely if an institution working amongst the poorer classes can attain this standard, the united efforts of the medical profession can do the same.

Summary of the Author's Views.

I propose to vary the usual procedure, and to allow someone else to write the summary for me. In 1925 Dr. Sydney Morris, senior medical officer of health for New South Wales, wrote in a prize essay as follows:

1. "What public opinion has not yet realised is that the civilised woman requires attention not only at the actual confinement, but also some considerable time antecedent to the latter. Provided that the woman can obtain the services of a competent midwife for the actual confinement and the puerperium, together with the advice and supervision of a careful practitioner during the later months of pregnancy and in any emergency during the actual labour,

most other conditions may be considered as relatively unimportant.

2. "When one has had the opportunity of investigating maternal deaths soon after the fatal issue, one cannot escape the conviction that a great many of them could have been avoided by competent attention to the patient or her condition or both prior to labour.

3. "The medical practitioner is frequently called in by the midwife owing to some emergency. He knows nothing of the patient or her previous condition and is compelled to undertake complicated obstetric operations at the last minute and under the most unfavourable conditions. Is it any wonder that such cases form quite a considerable proportion of those which are subsequently complicated by puerperal infection?

4. "Who is more apt to expedite the labour by instrumental means thereby increasing the potentiality of danger—the busy practitioner or the midwife with time to spare? Instrumental delivery involves anæsthesia, which is generally carried out in the absence of skilled assistance. During the operative manipulation the practitioner is frequently called upon to attend to the anæsthetic or some complication, and there is no time for subsequent sterilisation of his hands. Would such a practice be tolerated in any operating theatre? The shade of Lister would be expected to appear and point an accusing finger. Yet in dealing with a raw surface greater than any liable to be met with in any branch of operative surgery the greatest risks are assumed with equanimity.

5. 'Once it is allowed that forceps can be justified for the sake of expediting delivery either for the benefit of the doctor or to appease the clamour of the mother or her friends, the whole basis of natural midwifery vanishes.

6. "It is quite unusual for a woman to be thoroughly examined before her return home after the birth of her child. Nevertheless, it is very desirable that a thorough pelvic examination be made during the puerperium at some time prior to her return to ordinary life.

7. "Antenatal supervision will eventually be regarded as the key to success in preventive midwifery. Until such supervision is regarded by both doctor and patient as a first principle of midwifery, we shall not be able to bring about the reduction of maternal morbidity and mortality in those directions in which the latter are most preventable."

My own views have been formulated quite independently of Dr. Morris, although his were expressed first.

Perhaps the reason why our ideas correspond is to be found in the fact that in both cases these ideas are based on our actual experience of the present system of midwifery practice and of the consequences that flow from it.

A CASE OF SCHILDER'S DISEASE.

(ENCEPHALITIS PERIAXIALIS DIFFUSA.)

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Schilder's disease is now a definitely established, though rare, clinical entity. So far as we know, only between 20 and 30 cases have been recorded. It is for these reasons that we publish the following case.

Clinical Observations by Dr. C. T. C. DE CRESPIGNY.

On Feb. 11th, 1928, a boy, aged 8 years, was admitted under my care to the Adelaide Children's Hospital. He was brought for treatment because for the last eight weeks he had been unable to walk properly, and during the same period it was noticed that he was becoming deaf. His speech, his mother said, had never been very distinct, but during the last two months it had become almost unintelligible. No impairment of intelligence had been observed but owing to his deafness he could not understand well.

His illness had come on so gradually that its onset could not be placed very accurately, but he had been normal until about two months previously. He was said to be clean in his habits, able to feed himself, and not noticeably clumsy with his hands. In other respects no disability had been noticed. His development, until the present illness began, had been normal. He began school at the age of 6, and seems to have shown an average aptitude for his work there. He had measles when a baby, and whooping-cough two or three years later. The parents were healthy. The patient was the youngest of a family of four. The other three children were normal, and the mother had had no miscarriage or premature births.

Examination on admission showed a healthy-looking, well-nourished boy sitting up in bed and crying and behaving in a fashion rather infantile for his age. His attempts to speak produced only a confused, unintelligible mumble. He was very deaf, but seemed to understand simple sentences when they were shouted loudly in his ear. He could feed himself, and was quite clean in his habits. Apart from the deafness no defect was found in the cranial nerves. His pupils were equal and active in response to light and accommodation, and the fundi were normal. Nystagmus and strabismus were absent. The face was mobile and symmetrical, and the tongue and palate were normal. The ear membranes were normal. The strength and coördination of the arms were not impaired, and the deep reflexes of the upper limbs were equal. His abdominal reflexes were present.

FIG. 1.

The macroscopic appearance of Schilder's disease. On the left is a normal brain slice from the frontal region, while on the right a slice from the occipital region shows the brownish discoloration of the white matter.

His gait was very unsteady and of the "sticky" spastic type. He walked with slight flexion of the knees, and he had a tendency, it was thought, to go towards the left. In the recumbent position he could perform all movements with his lower limbs. It was noticed that he held his great toes in a permanent position of dorsiflexion. The patellar and ankle-jerks were very active, but clonus was not present. Plantar reflexes showed definite dorsiflexion of the great toes increasing that already present. No abnormality of sensation was elicited, but this was difficult to determine, owing to the patient's inability to coöperate.

Course of Illness.—His subsequent history is as follows: On Feb. 21st it was noted that there seemed to be no perception of sound either by air or bone conduction. The boy had a slight understanding of letters, but could not read well. By March 23rd hand movements had become less precise, and he fed himself only with difficulty. He tried to play with his toys, and was smiling and apparently happy. On the 31st a slight divergent strabismus of the right eye was present. By this time he had become quite silent, making no attempt to speak. By May 17th there was but little change. He had to be fed, but he ate well and slept well. He showed no signs of being able to see. On the morning of the 20th, however, he suddenly became very ill. Hitherto his temperature had been normal, his pulse regular, between 70 and 100 per minute, and his respirations about 20 per minute. Quite rapidly his pulse rose to 190, his temperature to 104° F., whilst respirations remained at 22. He regurgitated all fluids. The limbs became more spastic, and a spontaneous vertical nystagmus was present in both eyes. He died during the afternoon.

Special Examinations.—The blood Wassermann reaction was negative with the ice-box (Griffith and Scott) method (Feb. 17th). In the cerebro-spinal fluid a few cells were seen, mainly mononuclears. The globulin was slightly increased; there was reduction of Fehling's solution, and the chlorides were 750 mg. per 100 c.cm. The fluid was sterile in culture (Feb. 14th).

On Feb. 16th the ocular fundi were normal and there was no blurring or swelling of either disc. Both showed slight temporal pallor, but within physiological limits. On April 17th both discs were sharply defined, and there was no evidence of any swelling. Both showed temporal pallor slightly in excess of normal. On May 11th both maculæ were normal

Vestibular examination on Feb. 24th gave the following results with cold water:—Right ear: nystagmus began at 61″ and lasted 54″. Left ear: nystagmus began at 49″ and lasted 120″.

The following report was made following radiographic examination of the skull on Feb. 24th: "Frontal and sphenoidal sinuses undeveloped. The sella turcica is small. There is a thick bony wall with well-marked anterior and posterior clinoid processes. There is no evidence of erosion. No abnormality of the skull is evident."

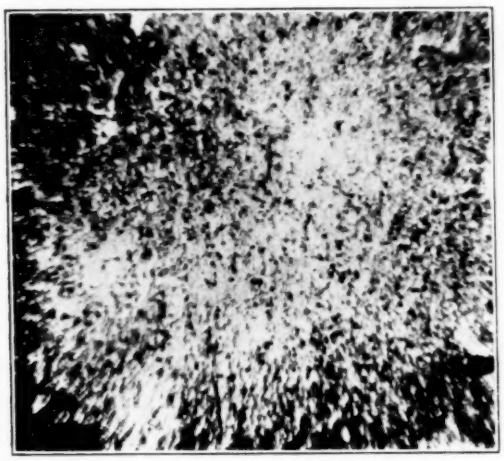
Summary and Commentary.

A previously healthy child of 8 years suffers from a progressive illness lasting between five and six months. Failure of hearing and spastic paraplegia are the first symptoms. Then there is rapidly increasing speech defect leading to complete dumbness. Sight is more gradually lost, and spastic paralysis increases in the lower limbs and extends to the upper. Finally, death occurs rather suddenly a few hours after the onset of acute symptoms of cerebral inflammatory type.

Post-mortem examination showed no abnormality except in the brain. The results of the pathological study of this organ are described by Prof. Woollard.

During life the recognition of the condition presented some difficulty. The diagnosis seemed to lie between a rapidly growing tumour of the brain and Schilder's disease. The chief arguments against the former were as follows: The signs and symptoms showed a very extensive and rapidly progressive lesion, but in spite of this there was none of the general signs of tumour. Headache, vomiting, and choked disc were absent, as were all other signs of increased intracranial pressure. The symmetry of distribution was in accord with recorded cases of Schilder's disease. The failure of hearing before that of sight had already been noted in a case recorded by Grainger Stewart, Greenfield,

FIG. 2.



Preparation stained by the Weigert-Pal method showing the demyelinisation of the fibres so that the white matter no longer takes the stain.

and Blandy[1] also, strangely enough, in a boy of 8 years. The subsequent blindness, unaccompanied by changes in the fundi, seemed to confirm the diagnosis.

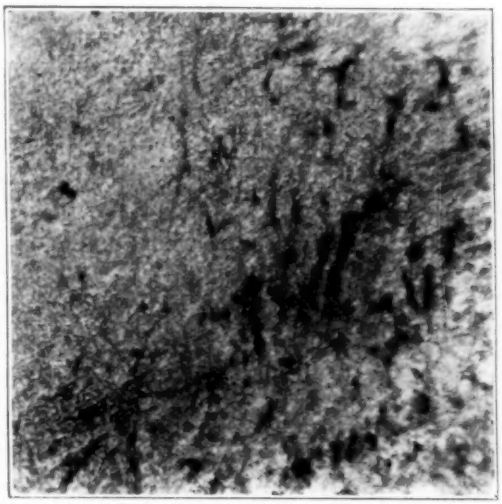
A good résumé of this disease appears in "Recent Advances in Neurology" by W. Russell Brain and E. B. Strauss[2] which includes a bibliography.

Pathological Notes by Prof. H. H. WOOLLARD.

It appears that 23 or more examples of this disease have now been collected. Of these the macroscopic examination of the brain has given a very similar picture in some 17. Microscopic analysis has been carried out in about six or seven, but this has naturally enough shown some divergence in detail though agreeing in essentials.

The present case of Dr. de Crespigny's was shown at a clinical meeting in Adelaide as a case of Schilder's

FIG. 3.



A high power view of the periphery of the demyelinised area. Weigert-Pal stain. Short irregular beaded fibres are seen.

disease, and it represents the first case discovered in Australia.

Macroscopic Features.

The brain presented no external evidence of disease. There was no vascular injection of the pia mater, the convolutions were neither engorged nor flattened, and there was no hydrocephalus or sign of increased intracranial pressure. When the brain was sectioned there was disclosed an alteration in the white matter of both hemispheres (see Fig. 1), including the posterior part of the corpus callosum. The change gave to the white matter a fused gelatinous appearance easily distinguished from the normal, the transition between the two being abrupt.

The affected area of white matter was situated for the most part above the level of a horizontal section that would have passed through the genu and splenium of the corpus callosum. This is in agreement with other cases described. The fused gelatinous appearance of the white matter extended symmetrically in both hemispheres and the corpus callosum in its posterior fourth presented a similar appearance. This involvement of the corpus callosum has not been mentioned in the cases whose descriptions are available to us. The areas of white matter involved are those of the occipital and temporal regions. After fixation the changed areas of white matter became brownish and friable. The crumbling of the material made section cutting difficult.

It is a striking feature that the cortex immediately adjacent to the gelatinous white matter appears to be normal and is separated from the diseased area by a thin band of normal white substance. In the occipital lobe it is easy to discern the stria of Gennari with the unaided eye.

All descriptions of the affected white substance agree on the following points. The disease is limited to the occipital and temporal regions of the cerebrum, the area affected is large and continuous and extends symmetrically in both hemispheres. The grey matter immediately adjacent to the affected white matter appears normal, and the passage from affected white matter to normal areas is abrupt.

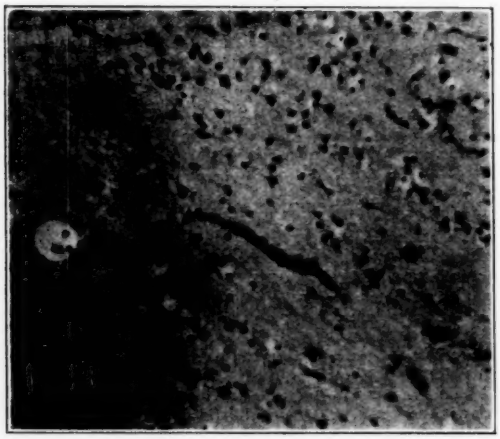
[1] Brain, 1927, l., 1.
[2] London 1929, p. 328 et seq.

Microscopic Changes.

Degenerative Changes.—The process of demyelinisation is the characteristic feature of the disease. The disease is not truly periaxial, for it soon spreads beyond the medullary sheath and affects the axis-cylinders, which ultimately disappear.

The process of demyelinisation was examined by the Weigert-Pal method. It is complete in the centre of the affected white matter, but at its margin short, twisted, irregular disconnected beaded fibres can be seen (Figs. 2 and 3). This demyelinisation is the essential and constant feature of the disease and all the examinations so far made agree on this point. The axis-cylinders were investigated by means of the silver-staining method of Bielschowsky, and the same series of changes were found in them. They had disappeared from the central part of the affected white matter, but at the periphery short, irregular, wavy, and apparently broken bits of axis-cylinders were seen.

FIG. 4.



Preparation of the occipital cortex by iron hæmatoxylin. The cells are normal and radial myelinised fibres can be seen.

Preparations of the overlying cortex by the same methods showed the preservation of the radial and tangential fibres, and also of the band of white matter immediately adjacent to the grey and separating it from the demyelinised area. The contrast between the normal and abnormal elements is sharp and striking. The use of Nissl's method confirms the normal appearance of the grey matter. Cell type, stratification, and the individual features of the cells, the position of the nucleus, and the character of the Nissl granules are all normal (Fig. 4).

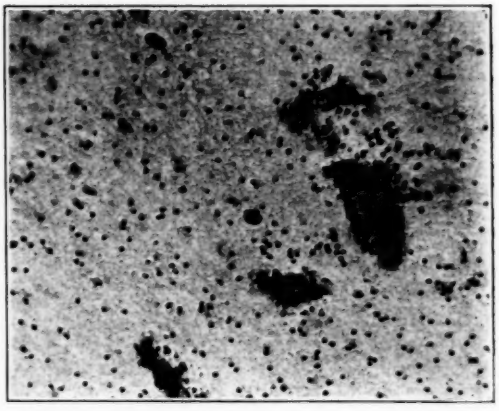
Inflammatory processes (see Fig. 5) are disclosed by sections stained with hæmatoxylin and eosin, by Weigert's iron hæmatoxylin and van Gieson, and by toluidine blue. In the neighbourhood of individual blood-vessels considerable accumulations of lymphocytic cells are seen. Such cells are also present in large numbers in the lumen of the vessel. The fibrous tissue of the adventitia has undergone some hypertrophy, and in the meshes of this the lymphocytic cells are abundant. Moreover, they extend for some distance from the vessels before becoming dispersed. The cells are predominantly lymphocytes, but a few plasma cells giving a metachromatic staining of their cytoplasm with toluidine blue are present. Besides these two types, larger cells, occasionally multinucleated, with abundant cytoplasm, often containing vacuoles and with Sudan III. showing an accumulation of fat-staining material, are present. These are the cells called "globoid" by Collier and compound granular cells by Stewart and his collaborators. It appears to be generally believed that these larger cells are of glial origin, but the use of neuroglial stains in this investigation did not bear out this presumption, and it is possible that they are of vascular origin. The endothelium of the vessels in the area affected did not appear to have changed its character.

Staining for fat by Sudan III. showed a much more intense reaction than did normal brain tissue similarly treated. In the cytoplasm of the large macrophage cells just referred to grains of fat-staining substance were visible. Similar changes of an inflammatory nature have been reported for other cases of Schilder's disease examined microscopically.

The neuroglia was stained by l'Hermitte's method, using Victoria blue. Hortega's bromammonium silver carbonate method was also applied, but the results obtained were not very successful. As in normal tissue the most abundant type seen was the fibrillary astrocyte. Other types could also be identified, but it did not seem at all obvious that there had been any proliferative activity of the neuroglia. Comparing the results obtained by the Victoria blue method with those obtained in normal brain tissue by the same method, it is concluded that in this particular case the neuroglia showed no particular response.

The macroscopic limitations of the disease seem so precise, even the overlying cortex escaping the demyelinisation, it is rather surprising that Stewart and his collaborators should emphasise the involvement of the nervous system as a whole. Sections of the basal ganglia, the mid-brain, pons, medulla, and cerebellum were studied by some of the methods already mentioned. Such sections showed that the vascular reaction extended beyond the macroscopic limits of the disease. Lymphocytic infiltration was seen in the cerebellum and the pons, for instance. Here it was probably less intense. However, nerve tracts and nerve cells appeared normal. No extensive investigation was made of tract degeneration, but the result of such stains as iron hæmatoxylin showed nothing to suggest that there was any noticeable demyelinisation beyond the limits of the disease.

FIG. 5.



A preparation stained by hæmatoxylin and eosin showing the lymphocytic accumulations about the vessels. Also larger cells are visible.

Conclusions.

In general, the pathological investigation of this disease shows: (1) Degenerative changes leading to demyelinisation and ultimate destruction of the axis-cylinders and so to the phenomena of Wallerian degeneration. (2) Inflammatory reactions of the nature of perivascular lymphocytic accumulations. (3) An area of demyelinisation sharply delimited, and a perivascular infiltration which, however, extends beyond the demyelinised area to the brain-stem and cerebellum.

It is to be expected that variations in the clinical and pathological details will occur, but the conclusion seems inescapable, since the essential features are so constant and uniform, that we are dealing with a single disease with its own special ætiology.

THE THERAPEUTIC USES OF LUMINAL.*

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LUMINAL is a drug of comparatively recent introduction, and is especially valuable in the treatment of epilepsy. To obtain the best results, however, it must be rightly used, and its injudicious employment in epilepsy is attended by risks which may be serious. First, then, I want to define its use in epilepsy. Secondly, luminal has proved a valuable drug in the treatment of a number of other disorders, all of them common ones, and, therefore, it has a wide sphere of usefulness in general practice.

Pharmacology.

Luminal, or phenobarbital, is a derivative of veronal, obtained by substituting a phenyl for an ethyl radical. Luminal itself is practically insoluble in water, but the sodium salt, luminal sodium, is readily soluble. For a mixture it is necessary therefore to use luminal sodium, which is incompatible with ammonium salts, and hence with ammonium bromide, and also with acids. It is important that a solution of luminal sodium should be as fresh as possible, as the drug deteriorates in solution, and I have frequently noticed that hospital patients who attend for medicine only once in three weeks or a month have most of their attacks a day or two before their visit, by which time their luminal sodium solution obtained at the previous visit has deteriorated.

Luminal sodium, being readily soluble, can be given subcutaneously or intramuscularly in 20 per cent. solution. I shall discuss doses later, but as a maximum it is doubtful whether grs. 5 or 6 can safely be exceeded as a single dose by the mouth, and I have never found so large a dose necessary. Luminal sodium is slightly less potent than luminal.

The *ill-effects* of luminal fall into two groups, rashes and neurotoxic phenomena. (1) Rashes are probably due to idiosyncrasy, as they are rare and may occur with small doses. They may be erythematous resembling scarlatina, papular resembling urticaria or measles, or combine both forms. The commonest site is upon the arms. (2) Symptoms of poisoning with luminal are those common to sedative drugs. In mild cases headache, vertigo, lethargy, and impotence occur, while more severe cases are characterised by ataxia, mental confusion, circulatory failure, and coma.

Luminal in the Treatment of Epilepsy.

What can we expect from the use of luminal in epilepsy? Tylor Fox[1] has recorded the effects of treatment of 167 epileptics with luminal. He found that 30 per cent. showed permanent benefit, 31 per cent. temporary benefit, 33 per cent. were unchanged, and 6 per cent. were made worse. Included in the 30 per cent. showing permanent benefit were 5 per cent. who were completely freed from fits, probably permanently. Major attacks respond to luminal better than petit mal.

On the debit side the most important fact relates to withdrawing the drug. In about 50 per cent. of cases it was found that after being treated with luminal for a limited period the patients actually had more fits after the drug was stopped than before it was begun, and there is a risk that status epilepticus may supervene if luminal be suddenly withdrawn.

I would suggest the following rules for the use of luminal in epilepsy:—

(1) Begin treatment with bromide alone, and only add luminal when the fits are not controlled by grs. 30 of bromide a day.

(2) In this event give luminal, in addition to bromide, beginning with gr. ½ night and morning, and increasing up to grs. 3 a day.

(3) If preferred, the same doses of luminal sodium can be combined with bromide in the mixture. In this case the mixture should be freshly made, preferably once a week.

(4) When the fits are nocturnal the main, or even the only, dose, should be given at night—e.g., grs. 1 to 2—and when the fits are diurnal, in the morning as soon as the patient awakens.

(5) When the fits occur at regular intervals—e.g., at one stage of the menstrual cycle—it is still necessary to give luminal throughout the month, as otherwise the fit may be merely postponed a few days.

(6) If luminal is to be withdrawn, increase the dose of bromide; and warn the patient at the beginning of the treatment against stopping the drug without advice.

(7) Perseverance and regularity are the twin watchwords in the treatment of epilepsy. I tell my patients when they begin treatment that they may require medicine in some form until they have been free from fits for three years. Relapses and failures to respond to treatment are often due to irregular dosage or to suspending treatment when the patient has been free from attacks for a few weeks. If all patients were treated thoroughly from the very beginning I am confident that the results of treatment would be very much better than they are.

(8) Status epilepticus may be treated by 2-gr. doses of luminal sodium in 20 per cent. solution subcutaneously.

Convulsions of organic origin—for example, those due to intracranial tumour or cerebral arterio-sclerosis—respond to luminal as well as idiopathic epilepsy.

Other Uses of Luminal.

(1) *Migraine.*—The pathogenesis of migraine remains a mystery, but we can usefully recognise three factors concerned in the precipitation of the attack. The influence of diet indicates that a metabolic disturbance may play a part. F. G. Crookshank has emphasised the psychological factor, and pointed out that migraine commonly occurs in the highly conscientious introvert, who experiences great chagrin when he fails to attain to the high standard which he imposes upon himself. Probably it is the metabolic concomitants of this state of anxiety which render its possessors liable to migraine. Lastly, migraine is the outcome of a cerebral disturbance, the nature of which is obscure, but which is probably vasomotor in origin.

In treating migraine we may endeavour to deal with the metabolic factor by advising the patient to avoid articles of food which precipitate attacks, especially eggs, cream, chocolate, raw apples, and some forms of alcohol, and to take regular meals. Treating the patient's temperament is considerably more difficult, but we can point out to him the source of his mental stress, and restrain him from pursuing sport at the week-ends with the same ruthlessness with which he devotes himself to work. If, however, we can eliminate the cerebral response to these abnormalities, we may hope to abolish the attacks. It seems probable that this is the mode of action of luminal and the reason for its effectiveness in the treatment of migraine. It is usually sufficient to give ½ gr. doses night and morning for a few weeks, and then continue for a time the nocturnal dose. Very few patients fail to respond with a marked reduction of attacks, and many become almost completely free from headaches.

(2) *Insomnia.*—Luminal is an excellent soporific, and the small dosage required is a convenience; gr. 1 to grs. 1½ at bedtime are sufficient in most cases of insomnia to procure a good night's rest, and few patients complain of dullness the next day. Not all types of insomnia respond equally well to the same sedative. I have found luminal especially useful in two types of case: (1) depressed patients, and (2) patients with organic disease—for example, high blood pressure.

Insomnia is an important feature of the clinical picture in mild cases of the depressive psychosis, of which every practitioner meets a large number, and which are not always accurately differentiated from neurosis. The characteristic triad of symptoms of which these patients complain is depression, loss

* Being an address to members of the London Hospital post-graduate course on Oct. 16th.

[1] Fox, J. T.: THE LANCET, 1927, ii., 589.

of appetite, and insomnia. Mental retardation may be experienced, and often presents itself to the patient as a feeling that "the brain won't work," but in mild cases hallucinations and delusions are exceptional. There is often a history of previous attacks, followed by complete recovery, and sometimes a family history of more serious mental trouble. The relief of the insomnia is an important part of the treatment. Luminal is also effective in the treatment of insomnia associated with mental excitement, but larger doses, up to grs. 5, may then be required.

It is rash to say of any drug that it never gives rise to addiction, but it is very exceptional for luminal to do so. The risk of habit formation may be diminished in the neurotic patient with insomnia by letting him put the tablet by his bedside and take it only if he is not asleep half an hour after going to bed. After he has secured a few nights' sleep by means of the drug he will often fall asleep without its aid if he feels that it is readily available.

(3) *Aural vertigo* is a complex subject, upon which I can only touch lightly now. It is convenient to distinguish clinically two types of aural vertigo: (1) An acute type associated with an acute lesion of the internal ear, an acute labyrinthitis, sometimes secondary to middle-ear infection, acute or chronic, sometimes of undiscovered ætiology. (2) The second and commoner type is found in the patient who suffers from recurrent attacks of vertigo of varying severity associated usually with deafness and tinnitus. This is a heterogeneous group. Most cases have not had purulent otitis media, but the condition is usually secondary to blockage of the Eustachian canal, with deflected nasal septum, polyps, infected air sinuses, chronic catarrh, or dental infections.

In this second group luminal is an exceedingly valuable drug. I cannot remember a patient who was not greatly relieved by it, and in mild cases complete freedom from vertigo is often produced in a few days. I give ½-gr. doses three times a day at first, and later reduce the dose. Luminal, of course, does not remove the cause of the vertigo, which must be sought and treated by otological methods.

Luminal is an excellent vestibular sedative in conditions of acute labyrinthitis, and I have used it also for vertigo due to lesions of the vestibular tracts and centres—for example, in encephalitis lethargica and disseminated sclerosis. It is useful as a preventive of sea-sickness.

(4) *Pruritus.*—I owe my acquaintance with the antipruritic effects of luminal to Dr. W. J. O'Donovan. It is especially valuable in cutaneous affections in which a large neurotic factor plays a part, such as pruritus ani. Used in gr. ½ doses and combined with appropriate local treatment it greatly diminishes the pruritus and so helps to break the vicious circle in which scratching keeps up an abnormal and irritating state of the skin.

(5) *Miscellaneous Disorders.*—Luminal is also useful as a sedative in chorea, whooping-cough, and exophthalmic goitre, and other uses for it will, no doubt, suggest themselves.

ABOLITION OF LETTERS OF RECOMMENDATION.—The governors of the Norfolk and Norwich Hospital have abolished the use of letters of recommendation on the ground that 75 per cent. of the patients are members of the contributory scheme, and that others can be admitted almost automatically on the advice of their medical men.

A BANKERS' HOSPITAL TRUSTEE.—The original trustees of the Yorkshire Home for Chronic and Incurable Diseases at Harrogate, which was established in 1881, have long been dead, the trust deed has been lost, and no new trustees have been appointed. The resulting difficulty has now been removed by the appointment of the National Provincial Bank as trustee for an honorarium of 10s. per cent. The rules have, at the same time, been amended by substituting the word "resident" for "patient." The word "hospital" has been deleted at the request of the inmates, on the ground that, as the National Health Insurance does not pay benefits to patients in hospitals, they are in danger of being denied their rights.

TWO CASES OF
HUMAN INFECTION BY THE AMERICAN HOG-CHOLERA BACILLUS.

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WITHIN the salmonella series of types the porcine strains referred to as *Bacillus suipestifer* (*B. choleræ suis*, or hog-cholera bacilli) and the human strains to which—in flagrant disregard of its original usage—the term *B. paratyphosus* C has of recent years been variously applied, form a cluster of species with specially close serological affinities. The composition of this cluster has been the subject of numerous studies, and one of us (White, 1926), piecing together and extending the work of others, concluded that these strains were divisible into four sharply-defined types: (1) Eastern or Hirschfeld, (2) American *suipestifer*, (3) European *suipestifer*, and (4) Glässer-Voldagsen or Ferkeltyphus.

The main differential characters of these types are set out in Table I.

TABLE I.—*Differential Characters of Four Types.*

—	Fermentation of—				Production of H_2S.	Serological relations.	
	Mannite.	Dulcite.	Arabinose.	Rhamnose.		Specific phase.	Non-specific phase.
Eastern or Hirschfeld type	AG	AG	AG	—•	++	Closely similar.	(See below).
American *suipestifer* type..	AG	—	—	AG *or* —	—		
Ferkel typhus type—							
Glässer strains	—	—•	A(g)	A(g)	+		
Voldagsen ,,	—	—•	A(g)	A(g)	+		
European *suipestifer* type..	AG	—•	—	AG	++	None.	

Non-specific phases of American and Glässer strains are to all intents identical; European and Voldagsen strains differ therefrom only by lack of any trace of specific phase antigen. The non-specific phase of the Hirschfeld type differs definitely from all the above by its deficiency in certain antigenic components.

A = acid; G = gas; (g) indicates that small amounts of gas are produced by some strains; — = No fermentation or no H_2S produced; —• indicates regular or occasional late fermentation; + = H_2S formed.

While the Hirschfeld type is known only from typho-septic disease in man, and while the European *suipestifer* type has been repeatedly encountered as a cause of food-poisoning outbreaks and of isolated cases of paratyphoid, there appear to be only two records of isolation of the American *suipestifer* bacillus from human sources; these are due to Krumwiede, Provost, and Cooper (1922), who describe a small outbreak of food poisoning due to this form, and to Hicks (1927), who isolated the organism in Shanghai from the blood of a paratyphoid sufferer. Furthermore, up to the present time the American *suipestifer* bacillus has not been shown to occur in Europe; it did not appear among 37 porcine strains collected by one of us (P. B. W.) from England and the

continent; its known strongholds are America and Japan.

It is therefore of interest to record two cases in which the organism was isolated in this country and as an apparent cause of disease in man.

NABARRO AND WHITE'S CASE.

V. R., a girl aged 8 months, was brought to the Hospital for Sick Children, Great Ormond-street, on Dec. 2nd, 1926, with the history of having been ailing for the past two months and of having lost the use of the arms from the shoulder to the elbow, especially the right.

On examination the child was well developed, but rather pale. Both upper arms were held rigidly at the side of the chest, and there was generalised swelling of the shoulder region on both sides. The shoulders were tender to palpation, although gentle, passive movements did not seem to cause pain. Radiographic examination showed periosteal thickening at the outer side of the upper arm, and of both humeri, also a small area of rarefaction at the upper end of the left diaphysis, and doubtful erosion at the upper end of the right diaphysis. No other joints were swollen, and the child had no fever. The right shoulder-joint was aspirated and about 1 c.cm. of thin, turbid fluid removed. This was investigated and an organism of the salmonella group was isolated.

Agglutination Tests with the Patient's Serum.

Samples of blood were taken on the eighth and thirteenth days after admission to hospital and were tested for salmonella agglutinins. Oxford standard suspensions of *B. paratyphosus* B and *B. paratyphosus* C (presumably Hirschfeld's bacillus), and a suspension of the organism from the joint fluid were clumped on both occasions up to serum dilutions between 1000 and 2500; Oxford suspensions of paratyphoid A, Gaertner and "Mutton" (Aertrycke) type bacilli were not agglutinated at dilutions 25 and above. An absorption test showed that saturation of the serum with paratyphoid B bacilli did not appreciably reduce its titre for Hirschfeld's bacillus or for the patient's own organism; another suggested that Hirschfeld's bacillus was unable to exhaust the serum of agglutinins for the patient's strain.

Two years later (Dec. 17th, 1928), when the child was called up for examination, its serum still clumped paratyphoid C-*suipestifer* bacilli up to dilutions between 125 and 250.

Widal tests, made in March, 1927, with samples of blood from the parents of V. R. revealed no agglutinins for any salmonella tested.

Cultural and Serological Features of the Organism Isolated.

In morphology, in motility, in failure to produce indol, to liquefy gelatin, to clot milk, to attack lactose, saccharose, and salicin, and in its gaseous fermentation of glucose and mannite the organism presented the usual characters of the salmonella group. Arabinose and inosite were unfermented; acidity did not appear in dulcite peptone water till the third week of incubation; lead acetate added to broth cultures remained undarkened during 14 days. These peculiarities are together characteristic of the American *suipestifer* or hog-cholera type.

The organism was found to be a typical diphasic form, and agglutination tests performed with its specific and non-specific phases and the phase antisera of various salmonella types grouped the strain unequivocally with the bacilli of the paratyphoid C-*suipestifer* series of types.

A number of comparative absorption tests were carried out. The essential results may be summarised as follows:—

1. The specific phase of strain V. R. completely exhausted the specific phase antisera of two America *suipestifer* strains (titre reduced from 10,000 and 20,000 resp. to <100); it almost exhausted a specific phase Hirschfeld type serum (20,000 to 200).

2. The non-specific phase of strain V. R. completely exhausted the non-specific phase antisera of the same two American *suipestifer* strains (25,000 and 50,000 resp. to <100) and equally exhausted the high titre sera of two European *suipestifer* strains. Similarly applied to these sera the non-specific phase of Hirschfeld's bacillus left considerable agglutinins (1000–5000). Acting on a non-specific phase Hirschfeld type serum the non-specific phase of V. R. was almost as effective in removing agglutinins as the homologous Hirschfeld strain.

3. A mixed phase serum prepared against strain V. R. showed an homologous specific phase titre of 25,000. This was reduced to <100 by treatment of the serum with specific phase American *suipestifer* bacilli, to 250 by treatment with specific phase Hirschfeld bacilli, and was unaffected by saturation with European *suipestifer* bacilli. The non-specific phase titre of the same serum was 100,000. Heavy doses of non-specific phase American *suipestifer* and of European *suipestifer* bacilli reduced this titre to <200, but the corresponding phase of Hirschfeld's bacillus left well-marked non-specific phase agglutinins (titre 10,000).

In fine the strain V. R. was found to correspond exactly and exclusively with typical *suipestifer* strains from the United States. Incidentally it may be noted that another strain, "Cole," also isolated by one of us (D. N.) from a case of joint abscess in a child, was identified as a typical European *suipestifer* strain, adding yet another instance of human infection by this organism. It would seem that the European *suipestifer* bacillus is particularly apt to attack young children and occurs as frequently in localised disease as in generalised febrile infections and gastro-enteritic poisoning.

DYKE AND SCOTT'S CASE.

The patient, aged 20, a labourer, was admitted to the Wolverhampton and Staffordshire Hospital on June 20th, 1927, having been ill for four days.

The onset of his illness was said to have been sudden with generalised indefinite pain and deafness. There was no diarrhœa and no vomiting. Delirium appeared in 48 hours, at first intermittent, but on admission persistent. It was of a violent character, the patient crying aloud, struggling, and continually attempting to get out of bed. The temperature on admission was 103° F., pulse 116, and respirations 28. The abdomen was distended but soft; the spleen could not be felt. Except some crepitations at the apex of the right lung there were no abnormal physical signs.

The patient died in hospital five days after admission, the duration of the illness thus being nine days. Delirium persisted during the whole of his stay in hospital until the final coma; the temperature ranged between 103.5° and 101° F. except for a brief period on the fourth day when it fell to normal; the pulse ranged from 116 to 140 most of the time and rose to 160 shortly before death. The bowels were opened normally about once daily; stools were firm and well formed. The urine showed no albumin and no deposit on centrifugalisation. On the fourth day after admission a large purpuric area about the size of the palm of the hand appeared on the left flank.

Autopsy.

The morbid changes found were those characterising an acute infection. The heart muscle was soft and friable; there were no abnormalities of the valves. The serous cavities showed no free fluid, but small purpuric flecks were present on both parietal and visceral pleura and on the surface of the heart. The intestines appeared normal; the liver was pale and fatty; the kidney showed a most intense cloudy swelling, the capsule stripping readily; the spleen was moderately enlarged, dark red, and soft; the lungs showed congestion, but no consolidation; the tracheal mucous membrane was moderately inflamed; there were no macroscopic abnormalities in the brain.

Bacteriology.

A blood specimen was taken for culture on the third day after admission. This showed in 48 hours an abundant growth of a small Gram-negative motile bacillus which grew readily on all the ordinary laboratory media. Cultures from the heart blood and spleen post mortem yielded a similar micro-organism. Mice inoculated with cultures of this bacillus died in one to four days with septicæmia.

In view of the obscure nature of the illness the case was reported to the Ministry of Health, and the circumstances were then investigated locally by Dr. E. Wilkinson, one of the medical officers of the Ministry. Inquiry showed that there had been no cases of similar illness in the family of the patient

nor in the neighbourhood, and no possible source of infection has since been discovered.

Identification of B. suipestifer, Group I.—A culture of the bacillus isolated post mortem was received at the laboratory of the Ministry of Health on June 30th, 1927. In colony and culture it resembled a salmonella; it fermented glucose and mannite with production of acid and gas and left unattacked lactose, saccharose, and dulcite; it failed to produce blackening of lead acetate even after ten days' growth. Colonies were tested for agglutination with the sera prepared with various salmonella types. It was found that 80 per cent. of the colonies agglutinated with the "specific phase" sera of *B. paratyphosus* Hirschfeld and *B. suipestifer* Indiana 49, but not with the sera of other types. With various "group phase" sera 20 per cent. of the colonies agglutinated, such colonies giving no agglutination with "specific phase" salmonella sera. It was thus possible by direct serological examination of the colonies to report within 24 hours that the infection was due to a diphasic salmonella belonging to the *suipestifer*-paratyphosus C series. Since such a salmonella had not at that time been described as indigenous in England further serological work was undertaken to determine to which of the sub-types of the *suipestifer*-paratyphosus C series it belonged and especially to see if it was of the American sub-type not hitherto found in human infections. The matter was mentioned to Bruce White, who proposed that our Wolverhampton case should be published jointly with the similar case in London already investigated by Nabarro and himself.

Specific and group phase cultures of the Wolverhampton strain were used to produce agglutinating sera in rabbits (intravenous doses of 0·1 c.cm., 0·25 c.cm., 0·5 c.cm., and 1 c.cm. of chloroformed broth culture) and absorption experiments set up as shown in Table II.

TABLE II.—*Absorption Experiments:* (A) *Group Phase Antigen.* (B) *Specific Phase Antigen.*

Serum.	Absorbed by—	(A) Titre (group phase).	(B) Titre (specific (phase).
Para-C Hirschfeld	Wolverhampton	< 100	200
	B. suipestifer Indiana 49	< 100	200
	Unabsorbed	25,000	6,000
Wolverhampton	Para-C Hirschfeld ..	3,000	800
	B. suipestifer Indiana 49	< 100	< 100
	Unabsorbed	25,000	6,000

These absorption experiments were performed by emulsifying about 100 mg. of the moist growth from agar plates in 2 c.cm. of a 1 in 50 dilution of agglutinating serum. This quantity sufficed in each case to remove all the agglutinin when the homologous strain was used.

The experiments show that the group-phase of the Wolverhampton strain and of the American *B. suipestifer* Indiana 49 removes all the group-agglutinin from the Hirschfeld serum. The group-phase of the *B. paratyphosus* C strain (Hirschfeld) leaves a considerable proportion of the agglutinin in the Wolverhampton group-phase serum, whereas from the latter serum the American *suipestifer* removes the agglutinin entirely. The specific phase of both Wolverhampton and Indiana 49 removes a large proportion of the specific agglutinin in the paratyphosus C serum, but leaves a small fraction unaffected, and the specific phase of *B. paratyphosus* C, while absorbing a considerable amount of the specific agglutinin from the Wolverhampton serum, leaves a fair proportion uncombined, although the American *suipestifer* removes it completely. Other absorption experiments show: (1) that the specific agglutinin for the American *suipestifer* Indiana 49 can be completely removed by the specific phase of the Wolverhampton strain; and (2) that a group II, "European," *suipestifer* leaves uncombined only the small proportion of specific agglutinin in a group phase Wolverhampton serum. This was shown by Bruce White (1926) to be characteristic of the relationship between group I. and group II. *suipestifers*. (The European *suipestifer* employed was that obtained in the outbreak of gastro-enteritis at Offenbach in 1926 and described by Braun and Mündel (1927).

It is interesting to note that the conclusion arrived at by serological analysis—namely, that the Wolverhampton bacillus is a group I. or American *suipestifer*, is in agreement with the cultural indications, the absence of dulcite fermentation, and the failure to blacken lead acetate being characteristic of the American strains of *suipestifer* as contrasted with *B. paratyphosus* C of oriental origin.

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THE TREATMENT OF PURULENT PLEURISY BY PLEUROTOMY AND BALNEOTHERAPY.*

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THE evacuation of pus from the pleural cavity is best attained by making a complete opening under local anæsthesia in an intercostal space along the posterior axillary line of the side affected. The superficial incision can be made anywhere, but the patient is transferred to a bath for the purpose of deepening the incision under water, the temperature of the bath being 104°–108·6° F.

Technique of Treatment.

The bath is flamed and filled to a convenient level, and the patient is washed down with soap and water. He sits in the bath so that the water covers the superficial incision, which is then deepened until pus is found. The edges of the wound are held apart by large forceps like sinus forceps. This brings about an interchange of pus and water, and greatly favours the expulsion of fibrinous exudations by respiratory impulse. The greatest possible quietness is maintained, and when the pleural lavage is considered sufficient the patient is lain down outside the bath; this brings about the expulsion of almost all the remaining fluid under respiratory impulse. A pad of sterilised cotton-wool is then placed over the wound and makes it a closed cavity. Under these conditions the surgical diaeresis performs the function of a valve which, by excess pressure, allows the intrapleural air to escape without admitting an equal amount; this promotes expansion of the lung.

Later treatment consists in repeating the bath after washing down, opening the wound fully by large forceps, and thereby promoting lavage of the pleural cavity. The duration, frequency, and temperature of the baths should be governed by the general condition. In serious toxic cases I advise two baths per diem, of five minutes' duration; in cases of medium intensity a daily bath of ten minutes suffices. According to his condition and stamina, the patient should get up and gain strength. The diet should be as nourishing as possible.

While the patient is in the bath it is interesting and very easy to discover if the empyema communicates with a bronchus. An adult is told to place his

* Translated from a paper read before the Surgical Congress at Buenos Aires, 1928.

hands over his mouth and blow through them as if warming his hands on a cold day, then to close his lips tightly, press firmly against them with his hands, and keep up the pressure of air in his respiratory passages. Should there be communication with a bronchus this air will escape from the wound and bubble into the water as often as the test is repeated—that is to say, to an indefinite extent. This repetition differentiates the air from gas which may have been formed by organisms or air which may have entered accidentally. The bubbling is exactly the same as if air were injected under water through a small tube. Infants cry, and so produce the same result. This manifestation, first observed by Dr. Enrique Foster while applying the treatment experimentally in his clinic for unweaned infants, is very important in prognosis. It indicates: (1) that the empyema springs from broncho-pneumonia, and (2) that it opposes the principle of treatment which endeavours to obtain a closed cavity. When the empyema communicates with a bronchial tube, the beneficial principle of a pneumothorax closed by a valve, such as is obtained in other forms of pleurisy, is not possible or is much impeded, inasmuch as the communicating bronchial tube, in all those efforts of the patient which are so useful for expanding the lung, injects air into the pleural cavity, counteracting the favourable results of the effort. Pleurisy with bronchial involvement is more intractable to treat and of longer duration than closed pleurisy.

Underlying Principles.

The hot bath has a very important effect on the general condition, for it brings about elimination of toxins by profuse perspiration and diuresis, and also by the neuro-nutritive stimulus of the bath; it improves appetite and makes the patients more active, thereby increasing their recuperative powers.

The advantage of this method is shown by the reduced period of treatment, which varies between 15 days in the most successful cases and two months. The work performed by Drs. Enrique Foster and Fernando Arancibia in the Children's Hospital shows that better results have been obtained with the bath than with other methods of treatment of empyema in unweaned infants. The peculiar gravity of empyema in unweaned children was taken as a test of the treatment.

The chief difficulty which the treatment has to overcome is the prejudice of the surgeons who, in accordance with the inflexibility of the teaching of asepsis, are antagonised by the lack of respect which this method shows for suppurating cavities, even when the rules of surgical cleanliness are meticulously observed. Nevertheless I venture to state that, no matter how much surprise the method may cause on account of its mode of operation, fundamentally it has not infringed any principle. What is obtained by asepsis in these cases is only relatively valuable compared with the process on which it acts. Taking as example a case of simple pneumococcic empyema, the standard procedure cannot avoid microbic contamination, to which the cavities are inevitably exposed by prolonged drainage. Asepsis can only prevent the penetration of germs of great virulence, which are kept remote from the wound more easily than the common germs living in immediate contact with it. It may be objected that the bath cure allows the common cutaneous germs to reach the suppurating cavity, but in fact it illustrates the benefit of hot water upon the general and local condition, and, at the expense of a certain concession in surgical conventions, gives the great advantages of operating with efficacy, simplicity, and ease.

Statistical Data.

My cases include the following:—

(1) Ten patients treated by me in the clinic of Dr. Marini: of eight adults, one died of pneumococcic meningitis, after being clinically cured of a fœtid pleurisy on the left side with bronchial involvement, which developed in two months; the other seven were cured. Of two children, one aged 4 years and the other aged 18 months, both were cured.

(2) Four cases treated by Dr. Nicasio Cuneo: two adults were cured, and two children, one aged 3 years and the other aged 5 years, with double pleurisy (the second occurring eight days after the operation for the first), were both cured.

(3) Thirty-nine cases treated in the Children's Hospital: of 15 over two years of age, 12 were cured and 3 died; of 24 under two years of age, 9 were cured and 15 died.

(4) One case treated by Dr. Foster in private practice, a child of 22 months, was cured.

Summarised, these figures are:—

Adults.—10: 9 cured, 1 died.
Children over two years.—15: 12 cured, 3 died.
Children under two years.—26: 11 cured, 15 died.

Statistics given by Drs. Foster and Arancibia on 72 cases of pleurisy in unweaned infants in the Children's Hospital, treated by different methods, show a percentage mortality as follows:—

	Mortality.
By minimum pleurotomy and drainage	90
By costal resection and drainage..	85
By puncture	65
By pleurotomy and bath cure	36

Conclusions.

(1) Unless a more extensive statistical study shows different results, it appears that purulent pleurisy is cured in greater proportion, in a shorter period, and with less difficulty by the bath than by any other method.

(2) When appreciating results we must remember that the great majority of cases of purulent pleurisy are complications of developing pulmonary affections.

PRINCIPLES IN THE TREATMENT OF COMMON DEFORMITIES.*

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ORTHOPÆDIC surgery is so closely associated with function that the patient is in an exceptionally good position to judge of the practical success or failure of what is done for him. Often perfect restoration of function is impossible, and it is therefore important that, before treatment is begun, the patient and parents should understand clearly how much improvement is to be expected; otherwise what we may consider a brilliant surgical success will to them be a disappointment.

Deformities are associated with changes in bones, joints or muscles, and their causes must be understood before the possibilities of cure can be assessed.

Causes of Deformity.

In *rickets* there is a deficiency of lime in the bone, and the softened bone readily adapts itself to posture; deformity is thus influenced by the incidence of body-weight. In *arthritis* the instinctive effort to prevent pain causes spasm of all muscles controlling the joint, and the stronger muscle groups determine the position in which the joint is fixed. The position of deformity in arthritis of any joint is therefore almost constant; it is adduction of the shoulder, flexion of the elbow and wrist, flexion and adduction of the hip, flexion of the knee and equinus deformity of the foot. So in *infantile paralysis* the deformity is determined by two factors: (1) persistent posture, and (2) the deflection of the joint towards the stronger group of muscles. These deformities once established will, as a rule, be aggravated by the incidence of body-weight. Early treatment by splintage would prevent their onset, but as a rule we see the patient when deformity is established, and the problem is the one of restoring

* Being a lecture delivered before the Chartered Society of Massage and Medical Gymnastics on Oct. 16th, 1929.

function. The methods commonly adopted for this are: (1) gradual correction of the deformity; (2) forcible correction of the deformity; (3) surgical exposure with division of tight structures; and (4) operations on bone. In cases in which the loss of function is not associated with deformity, the possibilities of improvement by operations on joints or tendons must still be considered.

Restoration of Function.

Gradual correction of deformity is a method which was successfully employed before many of the operations at present practised were surgically safe, and we can assess the value of modern operative methods only if we have experienced the possibilities of correction of deformity by gradual splintage. It has been my good fortune to be trained in a school in which success in the application of the principles of gradual correction of deformity has been very striking. I have learned that nature resents tension and allows relaxation of structures to which it is constantly applied.

It is generally agreed that division or elongation of muscles reduce their power, so that methods of gradual correction of deformity have a definite advantage in dealing with ischæmic palsies and infantile paralysis where muscle power is already deficient. Again in deformities resulting from rickets there is seldom any indication for operation while the disease is active. In practically all children under the age of 4 the deformities can be corrected by splintage, while the necessary general treatment to harden the bones is being applied. Gradual correction is the method which can be applied in cases of arthritis of joints before the stage of true ankylosis. It is also the method of choice for the early treatment of congenital club-foot.

Forcible correction of deformity is mainly utilised for the correction of claw-foot in children and young adolescents. Considerable force is also necessary for the reduction of congenital dislocation of the hip-joints, and also in cases of club-foot in which treatment has been delayed.

Surgical division or elongation of tight structures, as a preliminary to correction of deformity, is usually necessary in cases of torticollis, and to weaken muscle groups which are causing deformity in cases of spastic paraplegia.

Operations on bones or joints may be required to correct alignment in cases of established deformity, or to improve function by arthrodesis—i.e., by promoting sound bony union of certain joints. These operations are perhaps the simplest and most satisfying both to the patient and surgeon. Those commonly practised are: osteotomy of the upper or lower end of the femur in cases of established rickety deformity; operation for malunion of fractures, or deformity resulting from arthritis; and arthrodesis. This last operation is of special value in certain cases of loss of function resulting from paralysis, for instance, in cases of loss of power in the deltoid with active scapular muscles a very useful range of controlled movement of the limb is possible if the humerus is arthrodesed to the scapula in a position of moderate abduction. The controlled movement of the scapula is then transmitted to the limb, and in young patients with good scapular muscles the range of movement is so good that it is often difficult to detect the original disability.

In cases of paralytic deformity of the foot removal of bone and arthodesis of joints has proved very valuable. On examining a paralytic deformity of the foot, clinically or by X rays, it will be noticed that deformity has taken place mainly at the mid-tarsal and subastragaloid joints, and that there is little alteration of the relation of the astragalus to the bones of the leg. The to-and-fro movement at the ankle-joint is the important one for locomotion.

In infantile paralysis we cannot restore power to the atrophied muscles, but by reducing the number of joints which depend on them for stability we not only prevent recurrence of deformity, but leave such muscle power as is present for control of flexion and extension of the ankle-joint. This operation is known as stabilisation of the foot, and it consists essentially of correction of deformity by removal of bone at the mid-tarsal and subastragaloid joints, with after treatment which ensures that the os calcis, astragalus, and fore part of the foot become united as one bone in a good weight-bearing position. Subsequent deformity at the mid-tarsal and subastragaloid joints is not then possible. This operation may be utilised in other types of fixed deformity of the foot, such as old-standing club-foot, or to relieve pain in cases of tarsal arthritis.

Tendon Transplantation and Tenodesis.

The late war gave many of us an extensive experience of tendon transplantation in the restoration of function. The causes of failure in many operations previously practised were understood, and certain procedures are now recognised as essential for success. These are: (1) That before operation correction of deformity should be complete. (2) That the transplanted muscle should run in a direct line from its origin to its new insertion. (3) That the muscle should be of sufficient power to meet the strain which would be imposed on it. (4) That in the lower extremity a tendon should only be used to replace one of its own group—i.e., one normally in action with it. (5) That the tendon should be sutured under considerable tension.

The re-education of an individual tendon to act apart from its group appears to be more practicable in the upper extremity, where the action of individual muscles is more specialised than in the leg. The movements employed in locomotion are simple and controlled by groups of muscles, so that it is difficult to re-educate a muscle to act apart from its own group. In cases of paralysis of the quadriceps muscle transplantation of the sartorius or tensor fascia femoris to the patella is found effective. In the foot there are for practical purposes only two groups of muscles—viz., the anterior tibial, in action in dorsiflexion of the foot, and the peroneal and posterior tibial associated in action with the tendo Achillis in plantar flexion. Any of the anterior muscles may successfully replace one another—e.g., the tibialis anticus may be successfully transplanted to the outer side of the dorsum of the foot in paralytic varus, or the extensor longus hallucis may be transposed to the tibialis anticus. On the other hand, no tendon transplanted from the peroneal or posterior tibial group will be effective in replacing the loss of active dorsiflexion. The posterior tibial and peroneal muscles form one group. All are in action in extension of the ankle, so that they may be used to replace one another with certainty of success. The successful use of these muscles to replace a paralysed tendo Achillis is a striking illustration of the group action of muscles in the control of the foot.

In the upper extremity certain tendon transplantations have proved most valuable in the restoration of function; thus in musculo-spiral paralysis we find that loss of extension of the wrist, fingers, and thumb can be surely replaced by transference of the pronator radii teres, flexor carpi radialis, and flexor carpi ulnaris to the extensors of the wrist, fingers, and thumb.

Tenodesis is a method of utilising paralysed tendons as ligaments so as to limit movement of joints. It consists of embedding the proximal portion of the tendon in bone, and its use may be illustrated by the anchoring of a portion of the tendo Achillis to the lower third of the tibia to prevent calcaneus deformity in cases of paralysis of this muscle.

Although I have dealt mainly with the correction of established deformity, it must be recognised that many of these can be prevented by early treatment. For this a knowledge of simple splintage is essential. Whether we are dealing with fractures, arthritis, rickets, or paralysis the type of deformity is almost constant and its cause must be understood. Its prevention or correction will then present little difficulty.

Clinical and Laboratory Notes.

IMPLANTATION OF EPITHELIOMA IN THE ALVEOLI OF THE MAXILLA FROM PRIMARY GROWTH IN TONGUE.

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THE following case seems to suggest that the extraction of diseased teeth as a preliminary to operation for epithelioma of the tongue may have unfortunate results.

A man, aged 50, came to the Northern Hospital complaining of an ulcer and soreness of the tongue. He gave a history of excessive smoking and of syphilis 23 years ago. He stated that six months before he had noticed a white patch, presumably leucoplakia, on his tongue. About three months ago the tongue became sore on the right side, and a month later an ulcer formed. Lately he had noticed that he was salivating excessively, especially at night, and that he had pain now and then at the angle of the jaw. During the last month he had difficulty in speech, and deglutition had caused pain at the angle of the right jaw.

Examination.—The man was well built and apparently healthy. The right side of the dorsum of the tongue was almost completely occupied by an ulcer, which extended from the right edge to near the middle line; it came forward almost to the tip of the tongue, and extended back and just on to the anterior pillar of the fauces. The edge was irregular and heaped up, and the base sloughy and friable. The left half of the tongue showed many patches of leucoplakia. Movement of the tongue was restricted, and on attempting to protrude the tongue it deviated to the right. Salivation was very marked, and was streaked with blood. The teeth were all deficient, except for the two upper right molars, which were jagged. Pyorrhœa was marked. The submaxillary glands were enlarged and hard on the right side; they were not attached to the jaw. Speech was a little indistinct.

Operation.—Pending operation, the man was transferred to the dental surgeon, who removed the two molar teeth. He was admitted on June 16th, 1927, about one week after the teeth had been removed. Owing to the sloughy condition of the tongue, it was decided to excise the tongue before removing the cervical glands. On June 17th I tied the right external carotid artery, and then with the diathermy excised the right half of the tongue, both pillars of the fauces, and the tonsil. Under anæsthesia it was found that the tongue was indurated very far back, well on to its base, so that the excision was a formidable task. The late Prof. E. E. Glynn reported: Typical squamous-celled carcinoma with many cell nests.

Sequel.—Convalescence was uneventful, in spite of the size of the raw area. The temperature never rose above 99° F., nor the pulse-rate above 90. During the first two weeks the submaxillary glands showed some inflammatory enlargement. On July 2nd he was allowed to go home on the understanding that he would return for removal of the cervical glands. For some reason he did not return till August 31st, when it was found that the glands had become slightly larger and harder. On examining the mouth it was found that the right side of the mouth had healed up completely, and there was no evidence of any local recurrence. On the left tonsil there was a small ulcer, half an inch in diameter, irregular, friable, and obviously malignant. It spread on to the soft palate, but did not involve the tongue or the anterior pillar of the fauces. The two sockets of the right upper molars which had been removed were filled with fungating masses which projected almost half an inch from the alveolar margin. Although touching, the two masses were quite distinct.

As the removal of the right half of the tongue had been so successful, it was decided to try to remove the recurrences. On Sept. 2nd I excised with the diathermy the masses in the tooth sockets, and diathermised the surrounding tissues. I then excised the left tonsil and fauces, the left half of the soft palate, and that part of the tongue in proximity to the tonsil. The pathologist's report on tonsillar and alveolar fragments was: squamous-celled carcinoma exactly similar to lingual growth.

As before, the man showed little after-effects from the operation, but the area took a long time to clean up. In the meantime the glands showed so much inflammatory reaction that it was considered inadvisable to attempt an immediate excision. About a month after operation the mouth was clean, but the glands were now so enlarged, and the toxic absorption had so devitalised the man that he was allowed to go home on Oct. 15th. His private doctor kindly kept me informed of his progress. The mouth improved steadily, and there was never any sign of recurrence, either in the scar or remotely, but the glandular condition went rapidly from bad to worse, and the man died in December.

SOME OBSERVATIONS ON GAS AND OXYGEN IN GENERAL SURGERY.

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IN November, 1928, gas and oxygen, administered through a McKesson machine, was instituted in this hospital. Since that date I have observed its effects on a series of 165 cases, from careful examination of which certain deductions can be drawn. I have been struck by the following points in all patients who have had gas and oxygen: (*a*) the comparative rarity of post-anæsthetic sickness; (*b*) the early demand for food; (*c*) the complete absence of post-operative chest complications except in two cases.

No matter what the type of case—a big abdominal or a simple appendix—the ruling-out of any tendency to post-anæsthetic sickness and chest trouble is a most important argument in favour of gas and oxygen in general surgery. I have had frequent opportunities of observing the condition of patients who have had gas and oxygen and those who have had chloroform and ether mixture or ether, and in all cases I found a most striking contrast in the immediate post-operative period. The climax of the contrast was in every case on the day following operation, and despite precisely similar surgical treatment the gas and oxygen case showed the following points:—

1. Appearance of well-being with no undue discomfort. The chloroform and ether or ether patient showed much more collapse with pale facies.

2. The blood pressure and pulse-rate readings of the gas and oxygen patient were identical with the readings taken before operation, whereas in the others the blood pressure in every case had decreased by 10 to 20 mm. Hg, while the pulse-rate was higher by as much as 25 to 30 beats per minute.

3. The gas and oxygen patients showed little tendency to vomit and in many cases vomiting was conspicuous by its absence, whereas the other patients had considerable trouble from frequent retching.

Two Cases with Lung Complications.

Only two patients had distressful vomiting, and these were the cases which showed signs of lung complications. Both were women who had had frequent attacks of biliary colic before being admitted to hospital.

CASE 1.—A woman, aged 69, was admitted as an emergency case with acute cholecystitis. She was much collapsed and was having frequent spasms of biliary colic which were relieved by morphia. At the end of a week her symptoms had partially disappeared, while after four weeks' interval the acute condition had practically subsided and it was decided to perform a laparotomy. A cholecystogram three days previously had revealed the presence of two large stones in the gall-bladder. Under gas and oxygen the abdomen was opened by a right paramedian incision and a cholecystostomy was performed with removal of the stones; the operation took 35 minutes. She vomited at frequent intervals for four days after the operation, during which time the drainage was maintained. On the fifth day she developed a temperature of 103·5° F. with signs of congestion in the right base. On the eighth day, however, the temperature became normal and the signs in the lung had cleared up. She died on the tenth day and autopsy revealed a deep-seated subphrenic abscess with manifestations of what had been massive collapse of the right base.

CASE 2.—A woman, aged 48, had had several attacks of acute cholecystitis and was admitted in one of them. She was somewhat "chesty" and had a dilated irregularly-irregular heart. Four days later a cholecystectomy and appendicectomy were performed under gas and oxygen, the total time being 1 hour 20 minutes. Almost as soon as she returned to the ward she vomited, and this persisted at irregular intervals for three days. The day after operation her temperature was 102° F., her respiration-rate 32, and her pulse-rate 120. There were well-marked signs of a broncho-pneumonia of the right lung, from which she died at the end of the fourth day. At autopsy the right heart contained much blood clot, while the right lung showed definite patches of consolidation.

These two cases have been described because they were the only two, in a series of 165, which had any lung complications. They were both particularly adipose women; the former did not really die of a lung complication and the latter had a very bad family history. In this series there have been ten cholecystectomies, all the other cases running an uninterrupted course.

The Other 163 Inductions.

For herniæ, hydroceles, and empyemata gas and oxygen gave every satisfaction, both from the anæsthetic point of view and in the after-results, for these patients were discharged sooner than those who had had a chloroform and ether mixture or ether. In rib-resection for empyema a further advantage of gas and oxygen is that after the parietal pleura has been incised drainage is facilitated by giving oxygen under pressure.

This series includes 11 panhysterectomies performed under gas and oxygen with a good result in every case. Two cases of resection of large intestine for scirrhous stricture did particularly well, one case being discharged five weeks after operation. One particularly pleasing operation under gas and oxygen was a Cæsarean section for contracted pelvis in a woman aged 33 of particularly small build. As soon as the fœtus was delivered outside the abdominal wound the uterus almost immediately began to contract and retract, with the result that there was very little hæmorrhage. This was due to the fact that the uterus was not paralysed as it would have been under a deep chloroform and ether mixture or ether.

The only serious difficulties I have observed whilst operating with gas and oxygen are: (*a*) controlling the bowel which is apt to balloon out through the wound; (*b*) stitching the peritoneum.

The first factor is especially apparent while working in the upper abdomen or attempting to get a good field for examination of the uterus and appendages. This difficulty, however, can easily be overcome by carefully packing off the bowel with three or four abdominal towels. If this has been done methodically the bowel will give no further trouble, either in a cholecystectomy or a hysterectomy.

In stitching the peritoneum there may be difficulty in getting the peritoneum to come together, especially in an upper abdominal wound. This is greatly facilitated if, before the abdomen is entered, the skin, recti, and peritoneum are injected with 20–30 c.cm. of 0·5 per cent. solution of novocain. In most cases this is quite sufficient to give the necessary relaxation for stitching the peritoneum. Another factor which has been found to facilitate relaxation is placing a pillow under the patient's knees when he or she is put on the table, so that the hip- and knee-joints are slightly flexed.

In the clamp and ligature treatment of hæmorrhoids the previous injection of 15–20 c.cm. of a 0·5 per cent. solution of novocain into the external sphincter ani gives a beautiful relaxation under gas and oxygen and also assists in overcoming much of the discomfort from painful spasms that the patient is apt to experience in the first 8–12 hours after operation.

In all cases opoidine was given three-quarters of an hour or an hour before operation. In the majority of cases one-third of a grain only was given, but in a few cases, especially in alcoholics and heavy cigarette-smokers, two-thirds of a grain were required.

It is now agreed that, although the method requires a little extra care and patience on the part of the surgeon, such operations as a cholecystectomy or hysterectomy are not only possible under gas and oxygen, but are in the best interests of the patients.

I am indebted to Dr. E. J. Chambers (Doncaster) the honorary anæsthetist, for permitting me to publish these observations, and to the honorary surgeons for the cases.

Medical Societies.

ROYAL SOCIETY OF MEDICINE.

SECTIONS OF OBSTETRICS AND COMPARATIVE MEDICINE.

A JOINT meeting of these Sections was held on Oct. 18th, with Dr. ARTHUR GILES, President of the Section of Obstetrics, in the chair, to discuss the

CAUSES OF EARLY ABORTION AND STERILITY.

The Chairman began by speaking of the need for clear definitions. Sterility, he said, meant incapacity to conceive, and abortion should not be spoken of as a cause of sterility. A woman who had conceived at all—whether she had miscarried or not—was not a sterile woman.

Prof. ARTHUR ROBINSON (Edinburgh), in opening the discussion, said he could not accept the Chairman's definition. To speak of a man or a woman as sterile was not in accordance with the biological view of sterility. The object of fertilisation was to carry on the race, and sterility must be the opposite of fertility. He would define sterility as lack of the power of a pair to produce living young which could in its turn become fertile.

Varieties and Causes of Sterility.

Sterility might be due to injury, malformation, or disease of the genital organs. An interesting group of cases were those in which one or other of a pair was incapable of producing mature germ cells (gametes). In the male such a defect might be recognised and verified, but in the female he did not know of any way in which this could be done. In human beings menstruation was no criterion, nor was "heat" in animals necessarily so. Parkes had said that all the symptoms and signs of heat could be present in the absence of any ovarian follicles. By feeding a young animal on actual anterior lobe of pituitary it could be made precociously fertile. By feeding an adult animal with the same substance it could be prevented from producing either ova or spermatozoa. Thus by the same means one could hurry up something and also destroy the capacity to do something. This latter process might conceivably occur under ordinary conditions. If an animal could not produce germ cells there would be no abortion, but there was another group of cases in which the germ cells were mature but abnormal. In Canada Savage and Williams had tried to detect this abnormality in the spermatozoa of bulls. They had found that the heads of the spermatozoa varied in size, and that if this variation was beyond certain narrow limits the particular bull was not a good sire. Following service by such bulls there were many abortions and the progeny were, in general, poor.

Recently a good deal had been written about vitamin E, which was said to be necessary to fertility. It had been found that if female rats were fed on food deficient in vitamin E and then placed with a male, the embryos died on the eighth day of pregnancy. That was, from the point of view of the observer, the effect on the embryo or the uterus. But it might be that this E-deficient food had so affected the chromatic quality of the ovum that,

although it was capable of uniting with the germ of the other sex to form a zygote, the latter was unable to live.

Another group of cases was that in which neither member of the pair was unfertile with other mates, but the two were unfertile together. He had conducted observations on a series of horses; 3640 ova were shed by thoroughbred mares, and over 58 per cent. of them failed to produce young, though the matings were carried out under the control of the Scottish Agricultural Board, and all the stallions concerned were proved to be healthy. The inquiry extended over five years. Clydesdales were also investigated, this time over a period of six years. In these, 48 per cent. of the ova produced no result, though insemination had taken place in the ordinary way, under fairly skilled observation. How could this non-fertilisation be accounted for? Commonly it was thought that under ordinary circumstances every ovum would be fertilised and so help to form a zygote which would form a new individual, but, even under favourable circumstances, only half did so. In the case of the mare, abortion might occur without being noticed. There was no close attachment of the chorion to the uterine mucosa. In Scotland no records of abortion were kept.

To experiment it was desirable to use an animal which produced several at a birth, and which was not too large. He chose the ferret. He obtained 165 which were useful for the purpose, and they produced 1640 ova; 39 per cent. of these ova failed to form living young—i.e., the results of union with living spermatozoa were dead. All the animals were kept in good condition. Animals were killed at varying stages to see what had happened. An average of 24 per cent. died in the earlier stages of gestation, 47 per cent. in the later. Very few of the spoilt ova were found dead in the peritoneal cavity. Some ova were left unfertilised, while their neighbours were fertilised. There was a uniform style of living for all the animals, and the males used were the same. Examining the ovaries of animals which did not go to term, before the rupture of the ovarian follicles, the same number of follicles was found as in other animals, and the ova were apparently the same. The only explanation he could think of was that in the chromatic arrangement of the nuclei the paired arrangement of the so-called "genes" had become disturbed, and lethal combinations of chromosomes would cause the zygotes to die after fertilisation had occurred. In some cases, however, the spermatozoa might not be able to unite with the ovum. But there was one complication which he could not quite explain. Two people married and might have no children, but if one died and the survivor remarried, that survivor might have children; and the same thing might, of course, happen after divorce. Yet he had never heard of a case in which the pair had no children but after divorce both had children by their subsequent partners. In some places it was usual for marriage not to take place until after a child had resulted from cohabitation, and if no child was to be born, the parties tried again elsewhere. As in the case of horses the spermatozoa of one male might not fertilise the ovum of a particular female. When this happened he suggested that there was an incompatibility between the germ cells of opposite sexes, so that they did not fertilise, or if they did so the arrangement of the chromatic particles was such that the zygote might die at any stage after fertilisation. The period during which it might die did not end with birth. An abortion was Nature's way of removing a failure so that the parents could quickly have another chance of mature reproduction.

Mr. J. R. BARKER preferred not to attempt definitions of abortion and sterility. In cattle the two conditions gradually merged into each other. Early abortion in these animals, showing a macroscopical abort, was rare, though early abortion was probably common. Sterility was an everyday state. A bovine abort at 31 days, with unruptured membranes, was a mass of about 20 oz. Early abortion in cattle might be due to any of a number of causes. The morula might lack power to absorb nutrient materials, or such nutrient materials might be lacking, or deleterious materials might be present. Two other possible factors were the absence of placental areas and definite disease of the endometrium. Mr. Barker regarded sterility in cattle as only a previous state to an early abortion, both being due to the same disease-causing agencies. For purposes of discussion he submitted the following causes of sterility: (1) Failure of the male to produce perfectly functioning spermatozoa (orchitis). (2) Failure of a functioning spermatozoon to reach the ovum because of vaginitis, cervicitis, endometritis, or salpingitis. (3) Failure of the ovary to produce a perfectly functioning ovum because of oöphoritis. (4) Failure of any ovum to reach a favourable position for fertilisation in the Fallopian tube owing to the presence of salpingitis.

Abortion in Man.

Prof. H. BECKWITH WHITEHOUSE said that in Germany the number of abortions each year was said to be between 500,000 and 875,000, while in 1919 one abortion for every two births took place in Hamburg. In this country investigations based on 3000 patients admitted to a gynæcological clinic showed an incidence of one abortion to every 4·7 births. The proportion of women who aborted at some time in their sexual life was about 35 per cent. The attempt to arrive at the frequency of natural abortion was vitiated by the criminal termination of pregnancies.

For gestation to proceed in the natural way it was necessary (1) that the germ plasm of the oöcyte and the spermatozoon should have sufficient initial vitality; (2) that the zygote should be implanted in a position favouring its subsequent development; (3) that the nutrition of the ovum should be maintained. The natural site of attachment of the zygote was the decidua of the upper uterine segment. Many abortions after the twelfth week seemed to be associated with a low placentation in the region of the os internum. It was difficult to get direct evidence to show that defective vitality of germ cells led to premature death of the fertilised ovum. Of 1233 women 336 were childless, 71 of them having aborted. Of 153 women who had one child 64 aborted. A number of factors might be operative.

A woman, aged 33, was married for five years and was delivered of a dead child at the seventh month of her first gestation, though no cause was apparent. The Wassermann reaction in both husband and wife was negative. She was a small woman, a seven-months child, and was the last of a family of 13. Her mother also was a premature child, and was the last of 16 children; also all her immediate brothers and sisters had been premature. These people showed a succession of lack of reproductive vitality. An abnormal implantation of ovum in the uterus nearly always led to disaster. Implantation in the decidua was commonly followed by death of the ovum. When abortion took place at the twelfth week it was commonly attributed to a low deposition in the os internum.

The development and function of the decidua called for special consideration. Its growth depended on a hormone which was elaborated in the corpus luteum; hence lesions in the ovaries might account for many of the early abortions which were associated with uterine fibroids, displacements, &c. The Graafian follicle and corpus luteum were liberally supplied with nerve elements, and so inhibition of the latter might be the cause of the "reflex abortion" which followed mental or physical shock. Half the ova aborting during the first three months of gestation appeared to be pathological, and the view of embryologists was that pathological ova were the result of an abnormal environment, and not of any inherent factor in the germ cells. In the case of the eggs of certain fishes, sea-urchins, frogs, &c., it was possible, by using certain solutions, to produce from normal

cells every form of anomaly occurring in man, such as spina bifida and anencephalus. Hence it was likely that abnormal food factors and various toxins might form an important element in causing obscure early abortions. In the raising of animal stock and in egg production the importance of iodine was receiving ever-widening recognition. An adequate supply of calcium was equally important. The work of Evans and Burr on a specific antisterility food factor, vitamin E, promised a new field of investigation concerning the causes and treatment of repeated abortion. In a series of 300 cases investigated, said Prof. Whitehouse, in 58 (19 per cent.) the cause of the abortion was not known, 30 were due to prolapse, 21 to fibroids, 23 to metritis, 29 to salpingitis, 14 to retroversion, 10 to ectropion, 5 to cystomata, 9 to toxæmia, and 9 were criminally induced.

Contagious Abortion.

Mr. O. STINSON did not doubt that in cattle abortion was mostly due to the bacillus of Bang. In nearly every case this organism found its way into the alimentary tract and was not conveyed by the act of coitus. It caused a very serious state of things. At present 50 farms were affected by it in his province, and in some it had been active three or four years. Gradually, on any particular farm, the activity of the bacillus became reduced. On farms where abortion was rife many cows proceeded to full term, but never fully held again: they did not abort, but afterwards were sterile, though duly served by the male. Early abortion occurred among cattle with fair frequency. The later the abortion the greater was the liability to sterility. In some regions, said Mr. Stinson, there was a deficiency of calcium and iodine in the food, and the cows only conceived in July, August, and September. During the last two years he had been doing work on calcium deficiency and sugar deficiency, and he had arrived at the conclusion that there was a definite association between abortion and sterility on one hand, and calcium, iodine, and sugar deficiency on the other. Much had been said about giving insulin in diabetes, but little was said of the possibility of too much insulin being present in the organism. In cases of abortion he thought there was usually an upset of basal metabolism or of the secretion of the endocrine glands.

Captain S. R. DOUGLAS, F.R.S., pointed out that in human abortion infection was seldom mentioned as a cause. A Copenhagen authority reported that there was an outbreak of *B. abortus* fever among women in Denmark—500 cases in the year. Among the cases were eight pregnant women, seven of whom aborted. It must have been passed on from the cow to man. He asked whether there might not be other organisms which had the same effect in the human—possibly including Malta fever. If material were taken from the uterus immediately after abortion and examined, some bacterial cause for the mishap might be discovered.

Mr. LESLIE PUGH said that of the cows affected with contagious abortion, about 30 per cent. passed the bacillus out into their milk. He therefore supported Captain Douglas's plea for bacterial search in these cases. The Bang bacillus affected only sexually mature animals. If young animals responded to it, it would probably lead to the end of the disease, because of the immunity to it which would be set up.

Dr. S. FORSDIKE said that on expressing the contents of the corpus luteum by squeezing the ovary, the cow was enabled to become pregnant at the next service.

Mr. A. L. SHEATHER, D.Sc., confirmed Dr. Forsdike's statement. He had done that operation a hundred times; it was easily done by manipulation per rectum. Abortion took place four days later, and the cow could be successfully served afterwards. Surgical removal meant the loss of the cow. In many cases of human puerperal fever he felt that the infection had not been due to any handling by physician or nurse, but that the bacillus had been there all the time; such autogenous infection was found in bitches and cows which had not been handed at all.

The CHAIRMAN suggested that when a woman aborted at a stage when she already had mammary secretion it might be worth while to make a careful examination of her milk.

SECTION OF MEDICINE.

AT a meeting of this Section, held on Oct. 22nd, the chair was taken by the President, Dr. R. A. YOUNG, and Dr. W. J. ADIE opened a discussion on

DISEASES OF THE PITUITARY BODY.

The common tumours, the adenomas of the anterior lobe, were classified, he said, according to the staining of their cells, but much confusion had arisen around the terms used. He would therefore employ the names "acidophile" and "basophile" for the cells with granules that stained red or blue with, for instance, Mallory's acid fuchsin anilin-blue, and "indifferent" for the agranular principal cells, the Hauptzellen, that hardly stained at all, and he would speak of the tumours as granular or agranular. The tumour associated with acromegaly was usually a simple granular adenoma of the anterior lobe with acidophile cells; sometimes, however, the cells were basophile or mixed. The cells seemed to be more often basophile in acromegalics who had become obese or cachectic, but no rigid formula could be used for associating the character of the cells with the symptoms. The signs of acromegaly appeared before the tumour was large enough to deform the sella and were almost always very obvious before it began to cause visual or other pressure symptoms. This fact had given rise to a dangerous and erroneous impression that a tumour of the pituitary body was necessarily accompanied by endocrine signs; the commonest form of tumour might actually be very large and cause failure of vision with no glandular signs or with very slight ones. Persistent glycosuria occurred with granular adenomata only—i.e., in giants and acromegalics. In many ways it resembled pancreatic diabetes but ran a variable course. Acromegaly might remain stationary for years, or the headaches and malaise might cease although the body continued to grow. In these cases operation could not be recommended, although delay increased the danger. Should operation be performed in the earliest stages in order to prevent deformities? At present it was only done to relieve headache and conserve vision; early operation might hasten the inevitable cachexia. At present it did not seem justifiable to operate for glandular disturbances only. X ray treatment should always be tried in acromegaly, though it was little use in other forms of tumour. Radium had not given good results.

Adenoma of the anterior lobe without acromegaly was the commonest and most important tumour. It was almost exclusively confined to adults and was agranular. The cardinal sign was loss of vision; there might be nothing else. This condition provided one of the few opportunities of saving sight by prompt operation, but it was often lost through failure of early diagnosis. In most cases there was a tendency to adiposity with smooth, pale, soft skin, scanty hair, amenorrhœa or diminished potency, pale optic nerves, bitemporal defects, headaches, and enlargement of the sella turcica, but endocrine disorders might be absent and the sella might be normal. Pituitary tumour should be suspected in every case of failing vision, even when some other cause seemed to be present; toxic amblyopia was diagnosed too readily. A pituitary tumour might cause loss of tendon reflexes and pains in the legs, so that every apparent tabetic optic atrophy should be scrutinised very carefully; the Argyll Robertson pupil confirmed a diagnosis of tabes.

Tumours arising from the remains of Rathke's pouch were third in order of frequency, and were the only tumours to produce symptoms before the age of 15. The patient would be an intelligent and

cheerful child with gross signs of endocrine disorder, suffering from headaches and failing vision, swollen discs, bitemporal defect, and a deformed sella with shadows above it. Failing vision, however, might appear at any age in patients free from endocrine symptoms, and in adults the typical picture might be absent. The ultimate prognosis was bad.

The symptoms in these cases fell into two groups: those due to intracranial pressure and those due to dysfunction of an endocrine gland. A typical symptom was diabetes insipidus, about which there had been much controversy. Polyuria might occur when the lesion was confined either to the posterior lobe of the pituitary body or to the hypothalamus. The gland and the adjacent centres acted together as a neuro-endocrine mechanism, and this was probably true for all the symptoms associated with disease of this region. How the mechanism acted, whether it was nervous or hormonal, we did not know. Since injury to the tuber could produce polyuria although the gland was intact, the nervous centres seemed to be predominant. Moreover, injury to the tuber produced polyuria when the gland had been removed and the kidneys completely denervated; apparently a lack of the nervous impulses conveyed from the peri-ventricular nuclei to the medulla and by the splanchnic nerves caused metabolic disturbances in the tissues. The diabetes insipidus of pituitary disease was milder and associated with less desiccation and emaciation than that of midbrain disease. Polyuria was certainly not a simple symptom but the complex sum of a number of disturbances of simpler functions of vegetative centres. Until we knew more of the metabolism of water we could not solve the problems of growth and metabolism.

Mr. NORMAN DOTT reviewed a number of cases which illustrated the types of disorder, the nature of treatment, and the results. These included examples of simple hyperpituitarism in the child and in the adult, eosinophile hyperpituitarism associated with acromegaly, pure visual disturbance, and a combination of visual with other symptoms. There seemed to be some evidence, he said, that the eosinophile cells were connected with growth and the basophile cells with sexual ability.

Pathological Examinations.

Prof. E. C. DODDS called attention to some methods of investigating pituitary disease. Giant animals could be produced by injecting extracts of the posterior lobe of the pituitary into the peritoneal cavity. The extract of the anterior lobe stimulated the ovary to produce œstrin and, if it were injected into an immature female mouse, puberty would occur in 56–60 hours—i.e., the vagina would open and œstrus appear. In the mature animal the effect was to produce continuous œstrus for a few days, after which the ovary became exhausted and œstrus would be inhibited as long as the anterior lobe extract was continued. This might explain the amenorrhœa associated with pituitary tumour. In the very early stages of pregnancy there was a sudden discharge of anterior lobe hormone into the urine. If the urine of a pregnant woman were injected into mice the ovaries would be found studded with corpora hæmorrhagica, which was a definite sign of pregnancy. Anterior lobe transplants into an immature male produced puberty with descent of the testes and spermatogenesis.

Dr. O. LEYTON described experiments with various proprietary preparations of pituitary which were found to have very different effects on diabetes insipidus, although all contained a standard number of units of oxytocic substance. The best results were obtained from freshly killed animals: delay for even an hour weakened the action, as did also filtration. The work had led on to the separation of the vasopressor from the oxytocic substance. He believed that many cases were due to an increase of sugar in the blood without any great alteration in the power of utilising sugar.

Epithelial Tumours in the Pituitary Region.

Dr. MACDONALD CRITCHLEY reviewed the embryology of the pituitary and said that epithelial tumours were of two kinds: those growing from primitive remains in Rathke's pouch, and those growing from relics of the old cranio-pharyngeal duct, which were found in 80 per cent. of adult brains. The first were rare and simple, situated in or just above the pituitary. They were described as having a ciliated or columnar lining, but in his experience it was exceptional to find ciliated or columnar epithelium either in Rathke's pouch or in the tumours. The second group were of three kinds: (1) the rather rare simple papillary cysts which might show cuboidal or transitional epithelium several layers thick; (2) the common adamantinomata, characterised by a single peripheral layer of columnar cells in palisade formation bounding epithelial masses rather like the prickle cells of the skin. The sections resembled those of adamantinomata of the jaw, and commonly showed secondary keratinisation, calcification, or even ossification, which caused suprasellar shadows in the X ray; (3) spinal-celled carcinomata which were malignant and very rare, only five cases being on record. It was just possible that there was another type, arising from the infundibular recess and not derived from epithelium.

The Surgical Differential Diagnosis.

Mr. HUGH CAIRNS reviewed the conditions which might resemble pituitary tumour. While the physical changes of acromegaly were usually unmistakable, he said, he had known one case of hypertrophic pulmonary osteo-arthropathy mistaken for pituitary tumour. In acromegaly the overgrowth was not limited to the extremities; the tongue and vocal cords were also involved. Occasionally an acromegalic might have a normal sella turcica as the adenoma grew up into the diaphragma sellæ; this produced a scotomatous type of hemianopia, liable to sudden and rapid failure of vision. Fröhlich's syndrome was often mistaken for pituitary disorder. Cysts of Rathke's pouch were more often confused with tumours of the fourth and hinder end of the third ventricle; X rays showed typical calcification in 75 per cent. of cases. There was usually no calcification in suprasellar endothelioma or meningeioma, but the symptoms were bitemporal hemianopia and optic atrophy without endocrine disorder or distortion of the sella. Glioma of the optic chiasma led to optic atrophy and occasionally to defects in the visual fields, obesity, polyuria, and polydipsia; there was a pear-shaped prolongation of the sella into the optic foramina, which might also be enlarged, and the visual disturbance was out of all proportion to the changes in the discs. The patients were young and often showed brown spots on their skin. Glioma of the third ventricle caused obesity, polyuria, and polydipsia, but papillœdema appeared early. Cerebral aneurysm might cause difficulty in diagnosis and a tumour in the fourth ventricle might cause a dilatation in the third, which pressed on the sella and caused symptoms such as amenorrhœa, purely as a result of pressure.

Pituitary Dysfunction and Mental Disorder.

Dr. F. A. PICKWORTH described work on the relationship of infection of the sphenoidal sinus to disorders of the pituitary and brain substance. Organisms had been demonstrated within the pituitary in these cases. Resistance to the spread of infection from a septic sinus was offered by the sinus membrane and the capsule of the gland much more than by the intervening bone. A large deposit of colloid in the gland indicated previous adjacent sepsis, the normal amount of colloid averaging about 1·2 per cent. Endocrine disturbances were a marked feature among mental hospital patients, and Dr. Pickworth suggested that they were due to endocrine imbalance following pituitary disturbance after infections of low virulence, which spread very slowly along lymphatics

or thrombosed vessels. The symptoms varied according to the age and the stability of the other endocrine glands of the body.

Dr. T. C. GRAVES described two typical cases of pituitary disorder associated with sphenoidal sinus sepsis. The usual symptoms were general loss of muscle tone; disturbance of the peripheral circulation, causing extreme pallor and cyanosis of the extremities; disturbance of nutrition, with striking emaciation which might be followed by obesity; and disturbance of the reproductive mechanism, with amenorrhœa. An interesting feature was complete absence of pyrexial response to the injection of vaccines such as TAB, although the pulse-rate went up in the usual way. A large number of such cases had been collected and had improved after suitable rhinological treatment.

Dr. BERNARD MYERS referred to the importance of blood pressure, and Dr. ADIE briefly replied.

BRITISH MEDICAL ASSOCIATION.

ANNUAL MEETING IN MANCHESTER.

(*Continued from p. 826.*)

SECTION OF RADIOLOGY AND RADIOTHERAPEUTICS.

DEMONSTRATIONS.

FOUR demonstrations were arranged in connexion with this Section.

Cinematography of the Living Cell.

Dr. R. G. CANTI preceded this demonstration by a brief explanation of the technique employed in making the films. It was found that the study of growing tissues under the microscope by ordinary methods entailed an enormous number of personal observations. Not only was the work very fatiguing, but, since only fairly well-marked cell changes were sufficiently striking to excite attention during the comparatively slow progress of growth in tissue culture, the events leading up to the change were not noted. Cinematography provided a means of recording changes too small to be appreciated by the eye directly. Also, by securing cinema pictures at intervals varying from 3 to 60 seconds and projecting them at the normal rate of 16 per second, the processes which occupied many hours in occurring could be "speeded up" and shown as if they occurred in a few minutes. The actual "speeding-up" effect varied between 50, 120, 480, and 960 times. Elaborate precautions were taken to prevent vibration affecting the apparatus. The cultures photographed consisted of periosteum of chick embryo of 6–8 days' incubation, and of portions of tumour of Jensen's rat sarcoma, each in a suitable medium. Three reels of film were shown.

Reel 1.—After preliminary views of the explant upon its microscopic slide, to give an idea of the size of the fragment used, a cinema film of the edge of the living culture was shown on which the events of 27 hours were "speeded up" 960 times. Fibroblasts, wandering out at the culture-edge, rapidly gave it a fluffy appearance, whilst ahead of the fibroblasts a zone of rapidly moving wandering cells was strikingly shown. Following this, a picture at higher magnification clearly showed the stages of cell division, the daughter cells moving away in opposite directions. Next a hand was shown drawing a diagram of a vegetable fibroblast, to be replaced by an actual photograph at high magnification of the cell itself, in which the nucleus, nucleoli, and fat globules were clearly visible. Similar pictures showed amœboid movements in a wandering cell, with its fine pseudopodia. High magnification views of cell division followed, in which the details of mitosis were seen.

Reel 2 showed the effects of irradiation upon the same cells, the source of irradiation being radium emanation contained in small glass tubes. After a period during which normal cell activity was proceeding, the commencement of irradiation was marked by a "black-out" of the picture. The first pictures showed irradiation of chick embryo periosteum, and was "speeded up" 480 times. Cell mitosis and the spreading of the growing edge appeared to cease instantaneously. Very soon the wandering cells assumed a spherical form, and after a moment the fibroblasts contracted down into irregular spheres and showed the "bubbling" characteristic of breaking-down cells. Several records of similar experiments at different speed and magnifications were shown. The remaining pictures recorded the effects of irradiating Jensen's rat sarcoma, in which the same arrest of movement and cell division, assumption of spherical shape, and commencing breaking-down were demonstrated. The action of irradiation of the intensity used showed the following points. Fibroblasts of normal periosteum, though rendered immobile, showed very little structural change after exposure. Very few became rounded or broke down. Wandering cells all showed a marked effect after 20 minutes' exposure; movement ceased, and the cells became rounded, and their outline blurred. If a cell was dividing the process ceased at once. When the cells of Jensen's rat sarcoma were irradiated, all types appeared to be affected, whether mobile or fibroblastic in type. These experiments of direct observation appeared to substantiate the hypothesis of selective action upon malignant cells.

Reel 3 showed direct cinematographic film of living cells under dark-ground illumination. The cells shown were the vegetative fibroblasts of the choroid of the chick embryo in 2–3 days' culture. Cell structure and movement were shown with extraordinary clearness. Only cells which are flattened out between coverslips and radium, and which remain in one optical plane, are suitable for this method.

Living Cells in Tissue Culture.

A demonstration of living cells in tissue culture was given in the Manchester Royal Infirmary by Miss S. F. Cox and Dr. F. G. Spear. They showed living cells as seen with dark-ground illumination and cell division in living cultures. They also gave a demonstration of stained specimens and charts showing the effect of various physical agents on cells cultivated in vitro. These agents included hard beam X rays, soft beam X rays, radium, radium emanation, and cold.

Cases Treated by Radium.

A demonstration was given in the out-patient department of the Manchester Royal Infirmary consisting of 103 patients who had previously been treated with radium by the Manchester and District Radium Institute. The patients were demonstrated by Dr. G. E. Birkett, Mr. W. R. Douglas, Mr. A. Graham Bryce, Dr. O. Chance, Mr. A. H. Baker, and Mr. K. H. Watkins. They included 73 cases of carcinoma of the buccal cavity, mostly treated between 1925 and 1928; it was noticeable that there is practically no impairment of function following radium treatment. As the result of the experience gained during the last few years, the technique is now almost standardised, and consists of implantation of needles of low linear intensity (0·66 mg. radium element), screened by 0·6 mm. platinum for 8 to 12 days. The importance of an adequate active length (10–20 mm.) was emphasised. The treatment of the lymphatic drainage area in these cases by radium alone is not yet on a satisfactory basis, and where glands are palpable block dissections had been performed. These involve the removal of the sterno-mastoid muscle and internal jugular vein. As a rule implantation is carried out in the neck at the same time.

Eight cases of carcinoma of the breast, treated by implantation of a large number of separate foci into the primary growth and the lymphatic drainage area, were also shown. In such cases the axilla is exposed, so that the implanted units can be placed in position accurately. The remaining 22 patients had had cancer of various types, but chiefly epitheliomata and rodent ulcers of the skin. Some of them showed clearly that rodent ulcers involving the eyelids can be successfully treated without damage to the globe and with a perfect cosmetic and functional result. The implanted units in these cases, and the cases of carcinoma of the breast, were of the same linear intensity as are used for the treatment of buccal carcinoma.

Functional Studies of the Tracheo-bronchial Tree.

The "cin-ex-camera" is the term applied to a new apparatus designed by Dr. William A. Hudson and Dr. Hans A. Jarre (Detroit, U.S.A.). It is designed for the purpose of making successive X ray pictures on film bands at short enough intervals to permit of the interpretation of the functional changes

occurring in the organ being studied. The apparatus will make up to five records per second, and will handle a film band up to 80 ft. in length The width of the film band can be varied. The method of procedure in the studies of the tracheo-bronchial tree which was demonstrated was the passage of a small soft rubber catheter, with the aid of a direct laryngoscope through the glottis into the bronchus, under cocaine anæsthesia of the glottis. Through the catheter lipiodol was allowed to flow into the bronchi. Records were made at the rate of from one to four exposures per second. Studies were reported on five individuals:—

1.—A healthy young female, in whom there were noted: (*a*) Regularly occurring narrowings of the bronchi, which seem to originate in the peripheral bronchi, and seem to be associated with the propulsion of the oil toward the main stem bronchi. These narrowings occur regularly during expiration. (*b*) The fact that the angles at diverging bronchi are greater during expiration than during inspiration. (*c*) Evidence of rotation of the lung field is seen. (*d*) A measurable shifting of the bronchial tree downwards during inspiration is present. (*e*) A shifting of the bronchi closely simulating the opening and closing of a fan. (*f*) The fact that a suppressed cough can force material into the alveoli, but during quiet breathing no oil enters the alveoli.

2.—A male, aged 58, with a moderate degree of emphysema revealed definite narrowings of the bronchial tree, which definitely progress toward the main stem bronchus. This phenomenon is very similar to a peristaltic wave. The other observations made in Case 1 were also noticeable. In addition it was noted that in an emphysematous lung the lipiodol flows into the alveoli very readily, this being attributed to an enlarged atrial opening.

3.—In a case of long-standing bronchiectasis no evidence of motor activity in the involved bronchi could be seen.

4 and 5.—In two cases of asthma the bronchi were found to be in a continual state of bronchial spasm, in fact the lipiodol did not enter the terminal bronchioli. In addition, areas of temporary spasm were observed.

The authors believe that there is a definite motor phenomenon in the tracheo-bronchial tree. This phenomenon is inhibited in cases of long-standing infection of the bronchial tree, but is hyperactive in cases of an asthmatic nature.

SECTION OF MEDICAL SOCIOLOGY.

Value of Health Propaganda.

THREE papers written (1) from the point of view of the administrator by Prof. F. E. Wynne (Sheffield), (2) from that of the practitioner by Dr. H. C. Jonas (Barnstaple), and (3) from that of the press by Mr. H. A. Gwynne (President of the Institute of Journalists) had been circulated beforehand amongst the speakers invited to join in this discussion.

Prof. WYNNE adopted the rôle of *advocatus diaboli* as regards the claims to canonisation of propagandists other than workers in the statutory health services, and thereby gave zest to the discussion. Propaganda, he said, was a horrible word, and one of the unpleasant things popularised by the war, during which it came to mean "a competitive effort, in misleading the public of the particular nation concerned." It was, he said, essentially associated with the vulgarity which is an integral part of all successful advertisement. Public health propaganda and education had become the latest duty imposed upon local authorities, though much work of this kind had been done by voluntary organisations, the multiplication and overlapping of which had become, in his opinion, almost a public scandal. He thought the Minister of Health might be empowered to register these associations, to reduce their number from about 300 to 3, and to refuse registration to new competitors in this field. Whatever methods of propaganda were adopted, nothing should be done or said to accentuate that morbid absorption in his, or her, own health on the part of individuals, which is one of the worst vices of our time. The available methods were—public lectures, instruction in the schools, the distribution of special literature, and the judicious use of the public press. "Health weeks" could be organised so as to have an educational value, but might degenerate into mere stunts, without any lasting effect. Teaching of hygiene in schools ought to be valuable, but at present he was afraid it was not. In his experience the teaching given was, with few exceptions, perfunctory and in the wrong hands. Public lectures in large halls were of doubtful value, but lectures to small audiences, followed by questions and developing into discussions, were really educational. Most of the special literature which was submitted to him found its way to the waste paper basket, but he had found the magazine *Better Health* useful, and it was the only publication, apart from local leaflets, distributed by his department. As regards the use of the press, medical men were restrained by the rules very properly laid down by the General Medical Council, but could contribute articles on matters which they believed to be of public importance as from "a medical correspondent." He thought it was most important that the public should be kept in touch with the progress of medical science by wise and well-informed contributions to the press. Dr. Wynne concluded that the most important work done in the propagation of knowledge about health matters was that which was being done daily and persistently by our public health departments, their sanitary services, their maternity and child welfare services, their school medical services, tuberculosis services, and other sections of their activities; of these the public knew little, but they derived more benefit from them than they ever would from any much-advertised "propaganda."

Lord LEVERHULME said that he was intimately concerned with advertisement, but that he did not agree with Dr. Wynne that in order to be successful it must be vulgar. Industry was becoming increasingly interested in health matters. The periodical medical examination of employees had been suggested but was, at present, negatived, partly owing to the expense and partly owing to suspicion as to its object. The medical profession were unable to supply the signed articles which the press would prefer, and the profession could not help to advertise proprietary articles, although this would be useful to the public.

Dr. JONAS began by stating that he had taken some trouble to ascertain that the views expressed in his paper were generally approved by his brother practitioners. He went on to criticise the flimsiness of the evidence on which our population was alleged to be C 3. The most promising sign about the present health campaign was the stress laid on the education of the young. To teach healthy habits to the young was valuable, but to make the young think about their health implied failure. Dr. Jonas singled out for unqualified praise the Boy Scout and Girl Guide movements and the National Association for the Provision of Playing Fields. The method of propaganda adopted must not manufacture valetudinarians, or make people introspective. The search for health was not an aim in itself but only a means to a useful life. He was opposed to the circulation of cancer leaflets. Much good health propagandism was accomplished daily by the great body of general practitioners, especially by engendering in their patients a cheery optimism.

Mr. GWYNNE said the press was only too anxious to march side by side with medicine in the fight for public health. They were up against the strict rules and regulations of the medical profession. They were able to obtain an article from the best specialist on a particular subject, but it had to be published as "from a distinguished Harley-street specialist." He suggested that the British Medical Association might well examine this matter and see whether it could not evolve a solution of the difficulty and thus bridge the gulf between publicity and reticence.

Propaganda from the Public Health Services.

Mrs. E. D. SIMON (chairman of the School Inspection Subcommittee, Manchester) referred to the work of the school medical services, not only in caring for the children, but also in educating the parents. The general practitioner only saw his

clients when they were ill, but the school medical officer saw them when they were well and the beginnings of illness. There was now very little opposition among the parents in Manchester to the recommendations of the service. The dislike to dental treatment was being gradually overcome. As a preliminary to immunisation they must first explain the scheme to the teachers and subsequently to the parents. Propaganda by the school medical service was continuous, not spasmodic. It reached the bad and careless parents as well as the interested parents. It did not preach only to the converted like many public lectures and meetings.

Councillor WRIGHT ROBINSON (Manchester) thought the reports of medical officers of health were powerful agents for good, although they might be read only by influential people.

Lieut.-Colonel F. E. FREMANTLE, M.P., spoke in high praise of the voluntary associations, and pointed out that much coördination of these bodies had already been effected.

Dr. VEITCH CLARK (M.O.H., Manchester) thought the day by day work of the public health services, especially with the mothers and children, was the best form of propaganda. The lectures which brought the best results were those which were given at boys' clubs and similar places, sandwiched in among other items of a programme. Posters, he thought, were frequently indiscreet and lacking in earnestness or dignity.

The Press and the Medical Profession.

Mr. H. D. NICHOLS (President of the National Union of Journalists) thought this discussion under the auspices of the B.M.A. was a sign of the times. He believed that personal hygiene would become more important in the future. The only effective help given by the medical profession to the press at present was through the medical officers of health. It was high time that the medical profession as a whole should improve its publicity organisation, with a view to supplying orthodox and authoritative information.

Dr. H. B. BRACKENBURY admitted that he had been responsible for the wish that the hundred voluntary health societies should be scrapped and a single organisation formed. He caused some amusement by suggesting that Dr. Wynne might take upon his shoulders the unifying process. Dr. Brackenbury considered that the teaching of personal and domestic hygiene in the schools was one of the best methods of propaganda and that the general practitioner also had great opportunities.

Dr. WHEELER HART (Stretford) deprecated the alarming methods of propaganda adopted with regard to cancer tuberculosis and childbirth mortality. He had been 30 years in practice and welcomed education of the public in health matters but they must be careful not to make hypochondriacs.

Miss NORAH MARCH pointed out that the voluntary workers and associations had given the lead, which was subsequently followed by the Ministry of Health and the medical officers of health, and that in the penal clause of the Local Government Act, 1929, the status of these associations was given recognition.

Dr. EUSTACE HILL (Durham County) spoke very emphatically as to the value of the work accomplished by voluntary organisations and well-organised "health weeks." He was confident that the press could help much more and on better lines than at present.

Replies.

Lord LEVERHULME said they must have propaganda on health matters. The public could be led but could not be driven. The Daylight Saving Bill was an example of subtle persuasion.

Dr. JONAS thought the problem of coöperation between the medical profession and the press was almost insoluble, while Mr. Gwynne was slightly less pessimistic.

Reviews and Notices of Books.

COLLAPSE THERAPY IN PULMONARY TUBERCULOSIS.

La Collassoterapia nella Tubercolosi Polmonare e nelle Lesioni Distruttive del Polmone. By Prof. UMBERTO CARPI, Senior Physician to the Ospedale Maggiore, and Professor of Clinical Medicine at the Royal University of Milan. Ed. Cooperativa Farmaceutica. 1929. Pp. 268. L.40.

Prof. Carpi is an ardent disciple of Carlo Forlanini, who in 1880 brought to the notice of the medical world a method of treating phthisis by artificial pneumothorax. In a foreword on the historical side of the question he claims for his master absolute priority, although admitting James Carson, who wrote in 1820 "On the Elasticity of the Lungs," as one of the precursors. Prof. Carpi is also a supporter of M. Ascoli, who with Parry Morgan in this country has explored the use of partial bilateral pneumothorax when lesions are present on both sides of the chest. Indication for this form of therapy has been extended from phthisis to various forms of pleuro-pulmonary diseases, including hæmoptysis, pleural effusions, dry pleurisy, bronchiectasis, gangrene, and bullet wounds of the thorax. After an extensive explanation of these indications, the various forms of apparatus for artificial pneumothorax are described and illustrated, including the original instrument of Forlanini and that of Prof. Carpi himself. The advantages claimed for this instrument are that it acts by air displacement, has a working capacity of 100 c.cm., while its potential capacity is unlimited. It is very sensitive; a cylinder and piston act as an index of decompression or over-pressure in the pleural cavity. It accurately measures the amount of gas injected, and the quantity injected with each respiration can also be measured. The volumetric capacity of the pleural cavity can be ascertained by the measurement of the quantity of gas spontaneously aspirated, and it acts as well in the first production of pneumothorax as in the refillings carried out at a negative pressure. The instrument is easily sterilised, every part being detachable and capable of being washed in alcohol and ether. In a chapter on the physical signs found in artificial pneumothorax, Prof. Carpi draws attention to the area of hyper-resonance found in the opposite paravertebral region, which he attempts to explain. Just as happens in effusions, when the pleural sac, distended by fluid, is displaced towards the healthy side, so in pneumothorax the mediastinal pleura, owing to the tension of the gas, becomes a sac, which is pushed in front of the vertebral column and easily overlaps the middle line. The zone of hyper-resonance thus corresponds to the shape of the pleural cavity, and is more pronounced where the mediastinal pleura yields most—i.e., in the postero-inferior section, the so-called *recessus pleuræ*. In a chapter on the clinical practice of artificial pneumothorax some importance is attached to hypotensive pneumothorax as a therapeutic means of election. The efficacy of a pneumothorax at low pressure is subject to the condition that the lung is free from adhesions at the site of the focus. In such conditions the gas introduced even in lessened amount into the pleural cavity exerts its action on the lung in a measure proportionate to the elastic tension at the surface. Now the elastic tension is naturally diminished, if not abolished, at the site of destructive pulmonary foci, and on them the gas introduced exercises an almost selective action, even if it does not do so en masse on the whole lung.

Prof. Carpi notes that bilateral localisations in the region of the apex and hilus are those which best lend themselves effectually to this method, provided that with a moderate hypotensive pneumothorax there is sufficient expansion left in the free pulmonary bases. The force of the pulmonary elastic tension is at its minimum in the region of the hilus, weak at the apices, and greatest in the bases and edges. Small amounts, therefore, at a low tension, are sufficient

to neutralise those foci which are situated in the apex and hilus, and hence recent caseous lesions with a progressive tendency, and free from pleural complications, lend themselves best to the method of bilateral pneumothorax. There is much interesting and practical material in Prof. Carpi's book which will well repay the serious attention of those who are experts in collapse therapy.

FRACTURES AND DISLOCATIONS.

Treatment of Fractures and Dislocations in General Practice. Third edition. By C. MAX PAGE, D.S.O., M.S. Lond., F.R.C.S., Surgeon to St. Thomas's Hospital; and W. ROWLEY BRISTOW, M.B., B.S. Lond., F.R.C.S., Surgeon to the Orthopædic Department, St. Thomas's Hospital. London: Humphrey Milford, Oxford University Press. 1929. Pp. 284. 14*s.*

THIS book deals with the treatment of fractures and dislocations in clear and simple language. It is well illustrated, and provides just the kind of work that those who have to deal with fractures in general practice need for ready reference. No attempt is made to discuss a variety of ways of treatment for any individual fracture, but the methods selected are sound. The comparatively small size of the book is one of its chief attractions, and we hesitate to make any suggestion which, if adopted, might increase its bulk. It is necessary to say, however, that in future editions fractures of the ankle should be allotted more space; a classification based on the mechanism of their causation is more likely to give the reader a clear conception of these injuries and to enable him to follow the mechanical principles of their treatment.

This book should be in the possession of every medical student and general practitioner in the country.

SURGICAL PATHOLOGY.

Second edition. By WILLIAM BOYD, M.D., M.R.C.P., Professor of Pathology, University of Manitoba; Pathologist to the Winnipeg General Hospital. London and Philadelphia: W. B. Saunders Company. 1929. Pp. 933. 48*s.*

THE second edition of Prof. Boyd's Surgical Pathology has been generally revised and in parts rewritten. The chief changes are to be found in the chapters dealing with the stomach, the thyroid gland, and with malignant disease, especially in relation to tumours of bone, the testicle and the kidney, and the gliomata and melanomata. Many other sections have been recast so as to include new matter which has emerged since the first edition was published four years ago. All these changes have been carried out with judgment. Prof. Boyd's attitude towards disputed points is sane and critical; his discussions of the ætiology of malignant disease and the relation of gastric carcinoma to ulceration, for example, are admirably balanced; and the book as a whole may be recommended as a sound presentation of surgical pathology. There are 130 new illustrations, including a number of radiological ones, and several of the older figures have been replaced by others.

COMMUNITY HYGIENE.

By Dean FRANKLIN SMILEY, A.B., M.D., Medical Adviser and Assistant Professor of Hygiene in Cornell University; and ADRIAN GORDON GOULD, Ph.B., M.D., Assistant Medical Adviser and Assistant Professor of Hygiene in Cornell University. New York: The Macmillan Company. 1929. Pp. 350. 8*s.* 6*d.*

THIS is not a text-book, neither can it be classified with the popular books on health, since it is primarily intended for those preparing to fill a position in society which will involve responsibility for the life and health of others. Beginning with a short section on the history and development of modern public health work the author proceeds in simple terms to discuss the common sources of infection in man, and how best they may be avoided. The effects of the weather, the air, and sun on health, and the sanitary significance of the soil, good water, clean food, and adequate housing are next dealt with. Sections follow on such important community problems as mental hygiene, sex hygiene, tuberculosis, heart disease, and cancer. A strongly-worded warning on the need for guarding against quack remedies for cancer is included.

As an example of the improvements brought about in recent years in the health of the public by means of well-conducted schemes of hygiene, the sections on maternity and child welfare and on school medical work make interesting reading. The authors rightly emphasise the importance of the educative side of this work and the need for closer coöperation between health authorities and the community. Technical terms are avoided throughout and the work provides a general survey rather than a detailed study. Those wishing to make a deeper study of health problems will find an excellent guide in the numerous references supplied.

College students of all classes, teachers, and large numbers of the public interested in the welfare of the community will like this book. The medical student entering on his public health course would do well to read it, for it puts before him from the popular standpoint those problems which health authorities throughout the world are intent on solving.

SQUINT.

Its Causes, Pathology, and Treatment. Sixth edition. By CLAUD WORTH, F.R.C.S., Consulting Surgeon to the Royal London Ophthalmic Hospital (Moorfields). London: Baillière, Tindall and Cox. 1929. Pp. 246. 10*s.* 6*d.*

Mr. Worth's book on squint, first published in 1903, deals with the ordinary concomitant squint of children, not with the paralytic variety. In the preface to this new edition the author contrasts the treatment received 30 years ago by the average case of convergent squint with that received by a similar case to-day. There can be no doubt that the modern treatment of forcing the squinting eye to function by occluding or atropinising the good eye has great advantages over the older practice. Formerly when correcting glasses had been prescribed, the ophthalmologist took no further steps to prevent the good eye from continuing to do all the work. Thus the habit of suppressing the image in the squinting eye became so firmly established as to be permanent and incapable of alteration. The author claims to have proved that the amblyopia of a squinting eye is nearly always acquired from disuse, and it is the realisation of this fact that has been the cause of improved modern treatment. The younger the child when a squint becomes constant the greater the danger of amblyopia ex anopsia, and it is for children between the ages of 3 and 6 that efficient supervision can be most beneficial. The essential cause of squint is a defect in the cerebral function of fusing the two slightly differing images that fall on the retinæ of the two eyes. This power of fusion is a late development in children, and is usually not complete till about the age of 6; often it is absent altogether, but in many cases it is capable of being strengthened by practice—for instance, by Worth's amblyoscope, an instrument which can be adjusted to any angle. As a test for the different grades of binocular vision this instrument is of great service; as a means of education it requires much time and patience on the part either of the surgeon or of someone trained by him.

The theory of squint and the non-operative treatment are the main subjects of the book. Details of the operation for advancement vary in the hands of different surgeons; in describing his own method Mr. Worth lays special stress on the importance of getting a sufficient grip of the sclera with the sutures without going through. He has devised a special cutting needle for this purpose. Uncontrolled tenotomy he condemns, as do nearly all ophthalmic surgeons nowadays, unless for exceptional cases,

and the partial tenotomies practised in America he considers useless. For control he trusts to the lateral expansions of the muscle which should never be divided. He does not mention the plan, now often adopted, of reattaching the end of the divided tendon to the sclera further back than its original insertion.

THE ANALYSIS OF DRUGS AND CHEMICALS.

By NORMAN EVERS, B.Sc., F.I.C., and G. D. ELSDON, B.Sc., F.I.C. London: Charles Griffin and Co., Ltd. 1929. Pp. 372. 25*s*.

THE collaboration of a works chemist and a public analyst has resulted in the production of a concise and accurate book of reference. A works chemist is constantly receiving from his firm's customers samples of drugs and chemicals which are reported to have shown deviations from their normal characters; and in the investigation of these many fertile ideas originate. A public analyst, again, usually has a considerable accumulation of disconnected notes arising out of his routine tests which should not be lost to his less-practised colleagues. The reader of this joint work must have some acquaintance with analytical processes, for it is greatly condensed. Of the seven parts into which it is divided, Part V. (Galenicals) is of particular importance, and the appendix is invaluable. Here will be found information on the preparation of reagents, the specific gravity of alcohol solutions (with correction for temperature), the refraction of alcohols, sugar analysis, and the densities of various solutions. The methods described have been well tested, and can be followed with confidence.

DAIRY BACTERIOLOGY.

By BERNARD W. HAMMER, Ph.D., Professor of Dairy Bacteriology, Iowa State College; Chief in Dairy Bacteriology, Iowa Agricultural Experimental Station. London: Chapman and Hall, Ltd. 1928. Pp. 473. 25*s*.

TEXT-BOOKS dealing with dairy bacteriology are rare, though in recent years there has been a great extension of our knowledge of the bacteriology of milk and milk products. A comprehensive treatise by Prof. Hammer, whose investigations have contributed so largely to the development of the science of dairy bacteriology, is thus welcome. Its purpose is clearly defined—to supply a practical knowledge of dairy bacteriology to the technical dairyman. The subject is dealt with primarily from the economic standpoint, and the work provides a very complete survey of dairying problems dependent on bacteriology. A clear description of the normal lactic fermentation of milk is given, and of the causes of abnormal fermentations, with classification and characters of the organisms concerned. The chapters dealing with the bacteriology of butter and cheese include a detailed study of the bacterial, chemical, and enzymatic factors concerned in the production of ripeness, flavour, and aroma, and also in deterioration. The bacteriology of other milk products—i.e., condensed and dried milks, fermented milks, and ice-cream—is adequately summarised. Processes of milk preservation are fully described, the advantages and disadvantages of pasteurisation being discussed.

The book should appeal to public health officers as well as to dairymen, for the chapters dealing with contamination of milk and cream, and the precautions necessary for the production of clean dairy products are instructive. Valuable data, of which the tables on page 123 are a type, are given which serve to emphasise the influence of sanitary methods upon the bacterial content of milk. Of special interest to the health officer is the chapter dealing with diseases which may originate from milk and its derivatives or may be conveyed by them. The epidemiologist will appreciate the detailed accounts of recent milk-borne epidemics occurring in the United States. The references to infections by bovine tuberculosis and *Br. abortus* are quite up to date. In this section a summary of the present state of knowledge concerning food poisoning outbreaks due to milk and ice-cream would have been acceptable. An appendix, containing descriptions of the special media for the study of dairy organisms, would also have added to the value of the work, since these are not included in text-books of general bacteriology. The author has wisely embodied results of his own research amongst the valuable data supplied in each section, but he is not dogmatic. Recognition is given to the work of European authorities, such as Orla Jensen, W. G. Savage, and others, although we noticed no reference to the pioneer work of the Institute of Research in Dairying at Reading.

THE ART OF ANÆSTHESIA.

Fourth edition. By P. J. FLAGG, M.D. London and Philadelphia: J. B. Lippincott Company. Pp. 384. 21*s*.

THIS well-known text-book has been brought up to date, but has not altered much from its original form. As then, the distinguishing feature of the book, which is meant largely for the nurse anæsthetists of America, is the clear explanation of the way in which the phenomena of anæsthesia are produced and of their significance. The language is as plain as the excellent type. A quaint printer's error leads to "the anal sphincter of primiporous cervix" (p. 28). The least satisfactory section of the book is that dealing with chloroform. Here there are but scanty practical instructions, and a still less adequate physiological explanation of the peculiar dangers of the drug; nor is its use in midwifery given the consideration which that important side of chloroform administration certainly demands. The author's division of anæsthesia into two stages of induction, maintenance and recovery, simple and sensible in itself, is so complicated by the numerous subdivisions that we cannot give it preference over the classical four stages which we owe to Snow.

A BOOK OF CRIMES.

By A. SALUSBURY MACNALTY. London: Elkin Mathews and Marrot, Ltd. 1929. Pp. 328. 12*s*. 6*d*.

THE contents of this volume are ranged under the four headings Murders, Mysteries, Poisonings, and Thefts and Impostures. Of the 12 stories many like those of Madeleine Smith, Mrs. Bravo, Mary Blandy, Lord Ferrers, and Courvoisier are extremely well known, and several of them have appeared in the Notable Trials Series, or have formed the contents of other chronicles of similar character; but in each instance the author has attempted to obtain new information, and in some he advances further speculations towards the solution of remaining problems. Among the stories which will be unfamiliar to many English readers is that of the murder of the Marquise de Ganges, wife of the Sieur de Lande, a young French nobleman who was in attendance at the court of Louis XIV. when the Roi Soleil was at the top of his magnificence. The story of how the Marchioness met her death is elaborated frankly by some imaginative writing, and the fate of the Abbé de Ganges, the youngest brother and leader in the crime, is a sequel rounding off the story too symmetrically for credence, as the author suggests. The last story is that of Jenny Diver, the "dear artful hypocrite" of the "Beggars' Opera," and gives an amusing description of the methods of a beautiful and larcenous young prostitute in the reign of George II.

Dr. MacNalty may be congratulated on his ability to tell complicated stories vividly, and his medical knowledge enables him to lay proper stress on toxicological findings. But in two celebrated poison mysteries the process of unravelling gains nothing from the lapse of time, or the collocation of many theories. We are not helped to any decision as to the guilt of Madeleine Smith or the part played by the wife and the companion in the death of Charles Bravo.

THE LANCET.

LONDON: SATURDAY, OCTOBER 26, 1929.

THE HARVEIAN ORATION.

THE Harveian Oration of the Royal College of Physicians of London was delivered in the College on Friday, Oct. 18th, by Sir WILMOT HERRINGHAM to a full audience. The orator kept that audience deeply interested throughout a narration which, though related so easily, was replete with dated facts and quotations from contemporary sources—that is, contemporary with HARVEY. It will be increasingly difficult for distinguished persons, selected as official mouth-pieces, to find a new way of presenting their pious estimates of certain of our historic heroes, especially HARVEY and HUNTER. One method has been employed with great eloquence by different speakers in relation to HARVEY, and many will remember beautiful discourses, delivered within the walls of the College of Physicians, setting out the way in which HARVEY'S fundamental discovery transformed, as soon as its bearings and implications became known, the whole of medicine. But so thoroughly has this line of argument been pursued, that such reflections must, in the future, largely take the shape of showing how modern developments in pathology, as they occur, owe their clinical value to foundation upon the basis supplied by HARVEY. A second approach to the subject has suggested itself to many other orators who have, often with grace and erudition, expounded the text of HARVEY'S writings, and borne testimony to the analytical powers which he displayed in what Sir ARTHUR KEITH, from the anatomical point of view, has described as an unerring piece of detective work. A third method of keeping alive in grateful hearts HARVEY'S memory would naturally have been to draw a personal picture of the man and make him live before us in biographical shape; this has been done, as far as possible, by several orators, notably Sir GEORGE PAGET, and a fuller carrying out of the design can hardly be attempted for the excellent reason that material for doing it does not exist.

This fact was placed before his audience by Sir WILMOT HERRINGHAM in his first sentences when he described the extraordinary absence of general interest which followed HARVEY'S announcement of the true story of the circulation of the blood. Search in contemporary literature and memoirs has brought to light no mention by the leaders of thought in HARVEY'S day that the sun of medical truth had risen through the mists of ancient and mediæval speculation; and while the work of HARVEY went unnoticed by those among whom he moved, and who might have brought the news to the public attention, details of his private life are similarly scanty. At considerable intervals Sir D'ARCY POWER and Sir THOMAS BARLOW have resumed for us all that could be ascertained, and, since their researches, Sir WILMOT found that nothing of any consequence had come to light; but he was none the less able, by visualising for his hearers the social milieu in which HARVEY lived, to make "the little man," as he later affectionately called him, a real and intelligible character. As the personal medical attendant of CHARLES I. during that King's long struggle with the Parliamentary Party, HARVEY was in relation with both sides. He accompanied the King to Scotland, and after the detention of CHARLES by the Scottish Army, and during his period of imprisonment, HARVEY received passes through the belligerent lines, enabling him to continue his ministrations. And we get from what HARVEY did not do a suggestive picture of his absorption in what he considered it his duty to do. For practically he never said anything at all about what he either saw or thought. In his writings he mentions the King and Queen but once, and then in the usual terms of respect, while he mentions the Parliamentary Party once also, a little critically in respect of his own professional relations. Thus HARVEY was obviously a doctor and a physiologist, and obviously not either a courtier or a politician. In this connexion Sir WILMOT'S researches into HARVEY'S family, as represented by his several brothers, became pertinent, and the result of these researches made up much of his narration. All HARVEY'S brothers were engaged in trade. They were merchant adventurers, with London as the basis of their operations, while London was from the early days of the revolution the centre of the Parliamentary Party. The probability is, therefore, that as a doctor HARVEY stood by his patient, but that, as far as family tendency or environment went, he was prepared to see eye to eye on many points with Parliament.

And yet the closing passages of the Oration suggested that the mental capacities of the unfortunate King may have appealed to HARVEY'S philosophic mind in favourable contrast to the impressions of the intellectual abilities of the protagonists of the revolt. For Sir WILMOT found the leaders of the revolution, though temporarily successful, lamentably wanting in statesmanship, and the results to be not at all commensurate with the drastic nature of their objects or the manner in which they strove to obtain them. In a striking historical survey he drew a picture of the chaos into which the political and social life of the country had fallen by the close of the Protectorate, and, in so doing, he supplied, perhaps, the chief reason why the significance of HARVEY'S discovery escaped in an incredible fashion all popular notice. The people were too distraught to be able to respond to anything outside the pressing constitutional and practical needs of the country. Sir WILMOT HERRINGHAM'S Oration will long be remembered for its style and the manner of its delivery; it was a happy compound of dignity and simplicity.

THE PURPOSE OF THE BLOOD.

ONE purpose of the blood is well known; it is to carry oxygen and other foods to the tissues, to take away their excreta, and to keep them in such communications with one another as they effect by chemical substances. To serve these ends it is obviously essential that the blood should go round the body; bakers' vans and dust-carts are no use if they stand still. But the blood is something more than a nimble servant of the body; it is a tissue or organ whose chief business it is to be itself, to conserve its own individuality, and to take its place as a sovereign state in the commonwealth of the organism; for these purposes motion is not primarily necessary. It was to this aspect of the blood that Prof. A. E. BOYCOTT devoted his presidential address to the Section of Pathology of the Royal Society of Medicine on Oct. 15th (briefly summarised in our last issue), and he

made out of it a tale of rather wider interest than is generally comprised in hæmatology. The total quantity of circulating red cells, including those waiting in the spleen, together with the cells in the bone-marrow from which they arise, may be regarded as forming an organ of much the same validity as the liver or kidney. For this organ there is no definite name; he proposes that it should be called the "erythron"—which may or may not prove useful. The glossary of hæmatology is dreadful enough already and it seems a pity to add to it, though we admit that such a word avoids periphrasis and such confusion as may arise from such expressions as the "size" or "quantity" of red cells which may refer to individual corpuscles or their concentration in the blood as well as to the total amount of them in the body. He recalled well-known observations showing that the erythron is increased in size by a deficiency of oxygen supply to the tissues stimulating the marrow to activity whether this is due to high altitudes, obstructed respiratory passages, chronic carbon monoxide poisoning, slow circulation, or anæmia; these are representative examples of each of Prof. J. BARCROFT'S categories of anoxæmia as anæmic, anoxic, and stagnant. If the erythron starts to grow from the normal level this increase may be called "hypertrophy," if from a deficiency it is "regeneration." The two processes plainly cannot be distinguished. The failure of such hypertrophy in most cases of cardiac disease was attributed to the desire of the body to avoid throwing any extra work on the heart by increasing the viscosity of the blood and the extreme growth found in the Vaquez-Osler disease was interpreted as a benign tumour. Similarly, a decrease in the erythron ("atrophy") is produced by an excess of oxygen, as has lately been shown clearly by Dr. J. A. CAMPBELL, and experimental analysis of what happens to the excess blood in the polycythæmia produced by transfusion shows that this "atrophy" is an active process of destruction, not a passive wasting away.

What happens under all circumstances is that the body adjusts the size of the erythron to the prevailing circumstances, the basal consideration being the supply of oxygen to the tissues. The "normal" values for the red cells and hæmoglobin in the blood are determined by the accidental fact that we live in air containing 21 per cent. of oxygen at a pressure of about 760 mm. of mercury. Those who live in the Andes at 14,000 feet have a "normal" hæmoglobin of half as much again. It might obviously be better for the tissues to have a freer supply of oxygen than they get, but the objection to raising the concentration of red cells beyond its present value is that the increased viscosity of the blood would throw more work on the heart. The prevailing concentration of our blood is presumed to be the best compromise which can be made between these considerations, taken in reference to the rate of the circulation. Prof. BOYCOTT went on to point out that it was difficult to get away from the impression that these reactions were purposive in character, and he quoted several other instances of conditioned growth. Perhaps the most striking was an experiment on the liver by P. ROUS and L. D. LARIMORE[1] which deserves to be better known. Occlusion of portal branches to a part of the liver leads to a progressive and ultimately complete atrophy of the parenchyma deprived of portal blood and to hypertrophy of the rest of the liver. But the atrophy is conditional on the hypertrophy and it fails to progress when the bile-duct from the proliferating tissue is tied and hypertrophy checked. This is certainly analogous to the observations that transfused blood is not destroyed unless it is in excess and that a hæmorrhage is not regenerated if the animal is in no want of oxygen. Other illustrations were taken from the kidney and the regeneration of the claws in a prawn and the tentacles in a worm. Prof. BOYCOTT drew from these facts the conclusion that a frankly teleological outlook gave the fairest summary of the data and was also the most profitable in research; the reactions of animals are determined by their needs and directed by their intentions. It may be so, and teleology of one kind or another is certainly more in fashion than it used to be, though it is still abhorrent to those who look to a mechanistic analysis to solve the problems of living organisms. It is, too, a dangerous point of view in so far as it encourages anyone to substitute loose thinking for the hard discipline of experiment. But the phenomena of the adaptation of the blood to the environment are certainly very interesting and give hæmatology a position of general biological importance. One is reminded of the claim made a while ago by Dr. A. E. COHN,[2] of the Rockefeller Hospital, that scientific medicine, treatment excluded, might well be regarded as an independent science, standing on its own feet and needing detachment from practical life.

[1] Jour. Exp. Med., 1920, xxxi., 609.

UNDULANT FEVER IN ENGLAND.

IN 1921 L. E. W. BEVAN drew attention to the existence in Rhodesia of a type of undulant fever that appeared to be due to infection from cattle suffering from contagious abortion. Since then many workers throughout the world have reported cases of human infection with *Brucella abortus*. Whether this disease is actually increasing in prevalence, or whether the apparent increase is due to improved diagnosis, it is at present impossible to say, but Captain W. DALRYMPLE-CHAMPNEYS, in a report just published by the Ministry of Health, clearly favours the view that the increase is real. In this country he has been able to find records in the literature of only 14 cases of undulant fever, excluding those contracted abroad. To these must be added a fifteenth, reported by Dr. H. E. BLOXSOME and Dr. E. N. DAVEY in our last issue. On the other hand, the disease is very prevalent on the continent, in North Africa, and in the United States; in Denmark alone there are said to be 500 cases a year.

The mode of infection is extremely puzzling. It is known that *Br. abortus* is excreted in the cow's milk, and in one investigation, confined largely to the north-western districts of this country, the organism was actually demonstrated in 8·8 per cent. of samples of market milk. To conclude from this, however, that the disease is contracted from drinking raw milk is unjustifiable. If this were so, it would be reasonable to expect that the majority of the cases would occur in children and in females, but both in Denmark and in this country the results of agglutination tests suggest that the disease is most prevalent in young adult males. M. KRISTENSEN and P. HOLM [3] found that in Denmark the highest incidence was in agricultural workers, especially those coming into close contact with cattle, and they were therefore led to suggest that infection might be due to direct contact with infected cattle. In this connexion it is important to remember, as Captain DALRYMPLE-CHAMPNEYS points out, that cattle are not the only animals liable to be infected with this organism. He has collected information on the occurrence of

[2] Jour. Philosophy, 1928, xxv., 403.
[3] Centralbl. f. Bakt., 1929, cxii., 281.

abortus infection in swine, sheep, dogs, and horses, and he states that contagious abortion is common amongst sheep in France and that its importance is increasing amongst pigs in the United States. It therefore seems possible that infection may occur either by direct contact with diseased material, in which case the organism probably gains entrance to the body by skin abrasions or by the conjunctiva; or by the ingestion of infected food material such as milk, butter, or cheese. Whichever of these things happens there seems to be a general relationship between the prevalence of the disease in animals and its occurrence in man. The disease, in fact, presents many points of similarity to anthrax. As is well known there are two main types of anthrax: the non-industrial type seen in districts where the disease is rife amongst cattle and sheep, and affecting farm workers, veterinary surgeons, butchers, and others who come into close contact with the infected animals; and the industrial type, seen in manufacturing and urban districts, and affecting workers who handle material such as wool and horse-hair which is liable to be contaminated with anthrax spores. In the non-industrial type infection is direct from animal to man; in the industrial type it is indirect, passing through some intermediate agency. It may well be that two types of *abortus* fever in man will be recognised: the agricultural type, affecting farm-hands, and occasioned by direct infection from aborting animals; and the non-agricultural type affecting the population at large, and due to ingestion of infected milk and other products.

It is very desirable that we should learn more about the epidemiology of this disease, and Captain DALRYMPLE-CHAMPNEYS puts forward a series of excellent suggestions for investigation. In his opinion valuable information might be obtained from two main sources. In the first place, it is desirable to have careful investigation, with a report to the local or central health authority, of all obscure cases of continued or intermittent fever with symptoms and signs suggestive of undulant fever, or in which no other definite diagnosis could be made. The examination of the patient's blood for the presence of the specific organism, and the agglutination reaction with the blood serum and a standard brucella culture, should be carried out whenever possible. In the second place, he recommends the routine examination by the agglutination test, whenever possible, of samples of blood sent for diagnosis in cases of continued fever, or even those submitted for the Wassermann reaction. By these means there is little doubt that we should soon have a considerable amount of information about the frequency of the disease amongst human beings. But however interested we may be, as medical men, in the diagnosis of the disease, it is clear that for prophylactic purposes we shall have to devote far more attention to the disease in animals. At the present moment exact figures of the frequency of contagious abortion in cattle are impossible to obtain; nor is any accurate information available about the distribution of the disease in different parts of the country, although some rough figures were given at the discussion reported on p. 874. It seems desirable to enlist more fully the help of the veterinary profession to make a complete topographical survey of the disease as it occurs in cattle, pigs, and sheep. All samples of milk sent in for examination for tubercle bacilli should be examined for the presence of *Br. abortus*—a task involving very little extra trouble since this organism is pathogenic to guinea-pigs and can be recovered from the tissues by simple cultivation. And finally, all Widal-negative sera should be tested for agglutinins to *Br. abortus*, and a blood culture should be taken from all patients reacting to this organism at a titre of 1/80 or over. It may be pointed out that this country is admirably suited for such a survey. The confusion so often arising in other countries between *Br. abortus* and *Br. melitensis* should not occur here, for goats are not very common, and have so far not been found infected with the latter organism.

Annotations.

"Ne quid nimis."

GROUP OR STATE MEDICINE?

IF the public and the medical profession are no longer satisfied with one another, it may be, as DR. F. G. CROOKSHANK suggests in a recent issue of the *Forum*, because they never were. In any case he thinks that a little honest discussion can do no harm, and, like Sir Farquhar Buzzard, has made an interesting attempt to weigh the grievances of the public impartially, and to discover their cause. The poor have little to complain of, for on the whole they get the best doctoring there is. They have the opportunity when really ill of submitting themselves to the best medical opinion and treatment available, under doctors whose anxiety is not to please but to do their best. The rich come off next best because, although they can pay for the best medical advice and treatment in the land, they are able to choose for themselves, and in this choice they may be led astray in their choice of a specialist unless they act under the direction of a good medical adviser. This adviser should be their family doctor, who can tell them when to consult a specialist and what specialist to go to. But in many cases they have thrown him aside and sought specialists on their own account, guided then only by knowledge picked up from the papers, the best of which cannot be trusted to discuss a medical subject without eccentricity of opinion or material error, or by the idea that what costs most must be the best. The middle-class man's grievances are due first to the fact that he has aped the rich in throwing over his best friend, the family doctor, and putting himself in the hands of specialists who may not know enough of general medicine to have a proper grasp of their own specialty. The second and most pressing grievance of the middle class man is that, although he is not poor enough to receive hospital treatment, he cannot afford the fees of pay wards or nursing homes, with what seems to him their unnecessary and useless luxury. Dr. Crookshank's solution of the problem lies in a great extension of hospitalisation. Hospitals will have to be formed by communities or social groups, organised to deal with the different medical, surgical, and social needs of these groups. Doctors will have to abandon their prejudice against receiving public money for work done in hospitals and admit the need for a measure of public control over such medical service other than by purely medical boards or committees. Any system of payment by fee according to work done is, in his view, foredoomed to disaster. With such a scheme there would be: first, the present hospitals and infirmaries for the indigent sick; second, a chain of hospitals on the German model for the insured population; third, municipal hospitals for all citizens who might care to use them, the wards of which would be free, with cubicles or private rooms available on payment of a small additional contribution; fourth, coöperative hospitals organised by group enterprise, with or without municipal state subsidy, or by insurance corporations; and fifth, privately run hospitals or nursing homes with accredited medical or surgical staff for those who desire a luxury service. These hospitals would be partly staffed as at present by paid resident medical officers, but would

also have a visiting staff of physicians and surgeons who would be paid for their services while retaining the right to private practice. The general practitioner in the neighbourhood of such hospitals would keep in close touch with them and share the sessional work at the clinics. This is the solution of "group medicine," as distinct from that of "State medicine," which was advocated by Mr. T. Swann Harding in the previous number of the *Forum*.

FILTRABLE TUMOURS OF FOWLS.

IN casual references nowadays the term "Rous sarcoma" is often used loosely to indicate filtrable fowl tumours in general. This error is an injustice to the fine researches of the staff of the Rockefeller Institute, and, by the implied inference that only one filtrable fowl tumour has been discovered, obscures a problem of cardinal importance. It ought always to be remembered that Peyton Rous and his colleagues described and studied five filtrable tumours, comprising three distinct structural and biological types. No. 1 and No. 43 were simple spindle cell sarcomata; No. 18 and No. 38 sarcomata with a characteristic structure, and No. 7 an osteochondro-sarcoma. These tumours retained their characters during continued transplantation. When loose references to the "Rous sarcoma" are made it is usually tumour No. 1 which is meant, but it is seldom realised that this type is a relatively rare form of avian neoplasm. Since the first publications from the Rockefeller Institute on this subject observers in Germany, Japan, France, and Italy have added other examples of filtrable new growths of the common fowl. In this country two such tumours have been discovered and propagated by Dr. A. M. Begg, the first an endothelioma [1] and the second a fibrosarcoma.[2] During the first three years of its propagation by cell grafts the fibrosarcoma grew slowly—sometimes a year or more elapsed between two transplantations—and formed a hard fibrous mass with the structure typical of a fibroma. In the current number of the *British Journal of Experimental Pathology* Begg describes the subsequent behaviour of the tumour. It has quickened in its rate of growth and become softer and more cellular. Consequently it has now become possible to make filtrates from it, and these have proved to be potent; dried tissue is likewise active. The tumours engendered by both cell-free filtrate and dried tissue reproduce the structure of the parent growth. This change in malignancy calls to mind a relatively common and well-recognised property of the recurrent fibroma of man. The resemblance to a common typical human tumour is thus not confined to gross and microscopic anatomy, but includes also a well-known and serious biological character.

Each addition to the number and histological types of filtrable tumours forces the problem they represent into the foreground of cancer research. The work of Peyton Rous, J. B. Murphy, and their collaborators was buried for years in the obscurity of technical journals, partly because of the overwhelming preoccupations of the Great War, and partly because filtrable tumours run counter to opinions which had come to be regarded as finally established. Representing a concrete challenge to the biological conceptions of the origin of cancer they demand vigorous investigation. What is the nature of the causative agents present in potent filtrates? Are they viruses of extrinsic origin, or enzymes or other inanimate catalysts, manufactured in, and by, the tumour cell itself? Rous, in his pioneer work on this subject, gave some support to the virus theory, which has been espoused in this country by W. E. Gye. The opposite view that these agents are of intrinsic origin is, for the moment, in the ascendant, but opinion fluctuates as adherents of one or another school are vocal. Prof. A. E. Boycott has argued,[3] by analogy and on theoretical grounds, in favour of the intrinsic non-living catalyst theory. Evidence from experiment must decide this issue, but it is slow to accumulate. So far as the catalyst theory is concerned, almost the only evidence as yet brought forward in its favour is found in the work of Carrel and Brebner and that of Murphy and Leitch on the production of tumours with materials which cannot conceivably contain a virus. Tumour formation can be induced both in fowls and mammals by the application of dead chemical substances—e.g., coal-tar—but by this method the tumours appear only after repeated trauma over a long period of time. In the experiments of Carrel, Murphy, and Leitch the time of tumour formation after one injection was so short as to suggest the action of a specific agent. Carrel and Brebner used normal chick embryo and various chemicals, including arsenious oxide and indol; Leitch, in a solitary experiment, observed a tumour to follow the inoculation of normal fowl pancreas; whilst Murphy achieved the same result by injecting derivatives of normal fowl testis. The experiments of Carrel and Brebner have not been repeated; Leitch has already announced his inability to repeat his single observation, and Murphy's results remain unconfirmed.

It is true that a positive result is of more value than many negatives, and is not to be rejected as accidental until renewed efforts to bring it off again have failed. If it cannot be repeated either the conditions under which it had been obtained have not been completely reproduced or it is due to unnoticed errors which can only be eliminated by repetition of experiments. In the issue of THE LANCET of Oct. 5th (p. 697) Dr. Begg and Dr. Cramer related an experience of their own in which the inoculation of fowls with a simple extract of a mouse carcinoma was followed by the formation of the Rous tumour No. 1 at the site of inoculation. This was an experimental error, and Begg and Cramer were fortunate in being able to trace the sequence of technical operations which led to such a remarkable result. It was found to be due to the accidental use of a mortar, which was contaminated with tumour tissue derived from a No. 1 sarcoma. Such a simple explanation may not suffice to account for any of the unconfirmed observations of Carrel, Brebner, and Murphy—Prof. Leitch has already shown in THE LANCET of Oct. 12th that his observation cannot be explained in this way—but it does indicate the ease with which simple errors can creep unnoticed into biological experiments.

[1] THE LANCET, 1927, i., 912.
[2] Brit. Jour. of Exp. Path., 1927, viii., 147.
[3] See THE LANCET, 1928, ii., 817.

ARE ACCIDENTS A DISEASE?

THE study of industrial accidents continues to yield results of practical interest. First, examination of records disclosed that less than 20 per cent. of accidents were associated in any way with those dangerous power-driven machines to which thought naturally turned, while the great bulk originated from circumstances, such as persons falling or articles falling on persons, directly under human control—a control also largely concerned in machinery accidents, as motor-car accidents exemplify. Next, accidents were observed not to be chance occurrences, but to be so distributed that a small group of workers monopolised far more than their due share, according to the laws of chance. Further, clever statistical research established that individuals possess different innate liabilities for sustaining accidents, just as individuals vary in their tendency to succumb to infectious diseases, and that, given knowledge of the accidents experienced in the past by any group of workers, an accurate estimate can be made of the accidents they will experience in the future. Not only so, but those who experienced most accidents were found to suffer most sickness, and—a matter of no small economic import—to be the least efficient workers. Accident causation has been further linked up with the reaction of the worker to his surroundings by finding that there is an optimum temperature, about 67° F., at which the incidence of accidents

is least, but above or below which the incidence steadily rises. In fact, if the traumatic origin of the records were unknown, the morbidity and mortality under investigation would certainly be attributed to organic disease. The truth being that organic disease and accidents are end-results of the reaction of the living organism to its environment. Now these investigations of the Industrial Health Research Board have been carried a stage onward by new work [1] wherein tests were sought for by which those inherently predisposed to accidents might be detected. Probably few more unlikely searches have been undertaken; nevertheless no small measure of success has been achieved. It was undertaken by testing 1304 Royal Air Force apprentices, 387 Royal Dockyard apprentices, and 143 naval ratings, concerning whom information was available as to entrance examination results and subsequent accidents experienced. Tests were selected to bring out various characteristics, such as intelligence, stereoscopic vision, power and æstheto-kinetic capacity. The last somewhat cumbrously named tests included (1) responses to visual, auditory, and tactual stimuli; (2) skill at dotting a series of small circles passing by at an increasing speed; and (3) capacity to follow irregular movements of a mechanically controlled pointer. This set of tests enabled a group comprising 25 per cent. of the apprentices to be isolated; this group showed up worst at the tests, and were found to have an accident rate approximately twice that of the remaining 75 per cent. On the other hand, those who did well in these same tests tended to be more proficient in their occupations. Skill at æstheto-kinetic tests was not closely correlated with intelligence indicating that some types of mentality do not go with special sense muscular reactions; and those failing at the tests may include the class naturally fitted for scholastic and sedentary occupations. The capable authors of this report point out how they are breaking new ground with pioneer work, which must be advanced further before its full value can be obtained in practice.

BCG VACCINATION OF PIRQUET-NEGATIVE ADULTS.

IN a lecture published in *Tidens Tegn* for Sept. 20th under the alluring title: Will Norway be Free from Tuberculosis in Ten to Twenty Years? Dr. J. Heimbeck, to whose experiments with BCG on Pirquet-negative nurses reference has already been made in these columns, produced some remarkable figures and evolved a new scheme for the campaign against tuberculosis in Norway. His scheme is, in fact, a deliberate challenge to the present order of things in the administrative world of tuberculosis. The three chief headings of his lecture concerned: (1) the Pirquet tests performed by different doctors in various parts of Norway; (2) his own experiments with the subcutaneous administration of BCG to Pirquet-negative nurses, medical students, and others; and (3) a vigorous criticism of the conduct of the present official campaign against tuberculosis in Norway. With regard to the first heading, he showed how recent Pirquet tests had, apparently, upset the teaching that the overwhelming majority of human beings living in civilised communities are infected by the tubercle bacillus before adult life is reached. In Norway less than 50 per cent. of the population become Pirquet-positive during childhood. This observation is of far more than academic importance in view of the possibilities put forward by Dr. Heimbeck with such confident optimism of rendering the Pirquet-negative element of the country immune to tuberculosis by vaccination with BCG. With regard to the second heading, Dr. Heimbeck illustrated the accompanying diagrams with the following observations: In 1924 the communal hospital of Oslo at Ullevaal accepted 109 young women as probationer nurses, of whom 58 were Pirquet-positive, while 51 were Pirquet-positive when they first joined the hospital. As will be seen from the shaded portions of the two columns representing these two lots of probationers, only one of the originally Pirquet-positive probationers developed clinical signs of tuberculosis during her career as a nurse in the hospital, whereas this misfortune befell 17 of the 51 originally Pirquet-negative probationers. As amazingly great a proportion as 28 per cent. of the nurses who were Pirquet-negative on joining the hospital in the years 1924, 1925, and 1926 subsequently developed signs of tuberculosis. In January, 1927, Dr. Heimbeck began to inject BCG hypodermically into those probationers who, on joining the staff of the hospital, were Pirquet-negative, and who were willing to make the venture. As the diagram shows, there were 56 Pirquet-negative probationers joining the hospital this year, and of the 44 who were vaccinated only one subsequently developed clinical signs of tuberculosis, whereas five of the 12 Pirquet-negative probationers, who dispensed with BCG, subsequently fell ill with clinical manifestations of tuberculosis. The very striking difference between the fate of those Pirquet-negative probationers who were vaccinated in 1928 and those who were not vaccinated is indicated in the diagram. Of a total of 136 vaccinated nurses, only three subsequently developed tuberculosis, whereas 14 of the 34 control Pirquet-negative nurses, who were not vaccinated, developed tuberculosis. Dr. Heimbeck and his disciples have begun to give injections of BCG to Pirquet-negative persons outside the hospital, and in one district, Sollien, where this measure was begun two years ago, nearly all the Pirquet-negative inhabitants of this community, to a total of 150, were vaccinated. During this two-year period no new case of tuberculosis has occurred, whereas in the two preceding years there were five such new cases. These carefully controlled hospital experiments have reached a stage when their sponsors consider the time is ripe for advocating this measure beyond the confines of hospitals.

With regard to Dr. Heimbeck's third heading, his criticism of the present order of things is focused on the building of large and costly sanatoriums, where infectious cases are isolated only for a short period, and the provision of special homes for children threatened with tuberculosis, where an attempt is made to defer the date of infection—"a delay, the value of which is doubtful though costly." Dr. Heimbeck would stamp tuberculosis as "the most infectious disease we have," and would act according to this opinion. He recommends the earliest possible isolation of infectious cases, and to this end he advocates tuberculosis homes in which the patients can receive treatment, live and work. As matters stand at present, it is impossible altogether to avoid infection, and BCG vaccination must, therefore, be practised, preference being given in point of time to those who are most exposed to infection—i.e., children in tuberculous surroundings, and such young persons as probationers and medical students who must come in contact with infectious cases. Dr. Heimbeck would like to see the special homes for children threatened with tuberculosis radically converted into vaccination stations, to which these children would be admitted for examination (as to whether they were already infected or not) and for vaccination. Here they would remain, isolated from infectious cases, for the month or two necessary for the establishment of immunity following the vaccination. They would then be sent home, not only well, but also immune to the virulent infections to which they might subsequently be exposed. This system would enable many more children than heretofore to obtain admission to these special homes. Pending the accumulation of further experiences of the results of BCG vaccination, and the education of the community thereto, Dr. Heimbeck advocates a systematic tuberculin survey of the whole of the community, in order that exact information may be available as to

[1] A Study of Personal Qualities in Accident Proneness and Proficiency. By Eric Farmer and E. G. Chambers. Report No. 55 Industrial Health Research Board. H.M. Stationery Office. 3s.

who are and who are not already infected. When this information is obtained matters would be ripe for vaccination with BCG on a large scale, a proceeding which Dr. Heimbeck thinks would usher in a new era in the campaign against tuberculosis.

IRRIGATION OF EMPYEMA CAVITIES.

DURING the last few years a good deal of progress has been made in the treatment of empyema so that the mortality has dropped considerably, especially in the acute cases which follow the streptococcal or influenzal type of disease. The two chief principles of modern treatment are: (1) to avoid an open pneumothorax—i.e., to avoid operation until the empyema has become localised by adhesions; and (2) to wash out the empyema cavity. In a paper published on p. 870 of this issue Dr. J. S. Passeron describes a new method by which this second object may be achieved. After a preliminary incision through the skin the patient is put into a bath in which the empyema is opened so that the water of the bath mingles with the pus; the wound is held open with forceps in such a way that water has free access to the empyema cavity, and the pus and fibrinous exudate are expelled into the bath. Sometimes two baths a day are given in severe cases. When there is communication between the bronchi and the empyema cavity, air can be expelled through the lung and is seen bubbling through the water. In the case of children this expulsion of air will be noticed when the child cries and affords a method of ascertaining whether or not there is a bronchial fistula. Most of the cases hitherto treated by this method have been children, and while a bath of this sort may well have proved a convenient means of dealing with them, the difficulty of moving patients into the bath would sometimes arise in the case of adults. Modern methods of irrigation give pretty satisfactory results, but those recorded in Dr. Passeron's paper are certainly promising, and, as he points out, facts should have more weight than theories.

DESERTING A CONSUMPTIVE WIFE.

A HUSBAND, summoned at Marylebone police-court last week for the desertion of his wife, made an unusual defence. He pleaded that he was acting under medical advice in living apart from her, as she was consumptive. Unimpressed by this plea, the magistrate ordered him to pay 18*s*. weekly towards the maintenance of his wife. The wife in her evidence had admitted her ill-health, but said she had told her husband all about it before the marriage. Legally, it appears, it would have made no difference if she had not told him. Marriage is not one of those contracts classified by lawyers as *uberrimæ fidei*—that is to say, contracts of the utmost good faith in which (as in the case of a contract of life insurance) one party must disclose to the other every single circumstance which might affect the other party's mind. A woman once became engaged to marry a man without telling him that she had previously been shut up in a lunatic asylum. It was held that this non-disclosure gave the man no right to break his promise to marry her, provided that she was sane at the time of their engagement. "It would be most mischievous," said Lord Kenyon in 1797 (Atkinson *v.* Baker), "to compel parties to marry who can never live happily together." Nevertheless it has been held that a man cannot escape from his promise to marry by pleading his own bad health. In Hall *v.* Wright (1858) a defendant alleged that, since his promise to marry, he had become afflicted with a dangerous illness, occasioning frequent and severe hæmorrhage of the lungs. But the judges held that this was no defence to an action for breach of promise; the lady might like to be his widow. Ill-health is a valid excuse for the non-performance of certain contracts for personal service—e.g., by a professional singer; it is not allowed to be a valid excuse for the non-performance of a contract to marry, even if the ill-health be such that the performance of conjugal duties would endanger life. The legal view, it will be noticed, is not eugenic. Some day, perhaps, a reform of the divorce law will allow the marriage contract to be dissolved where one party suffers from permanent and incurable mental or physical disease. That reform, however, if and when it comes, will have no bearing upon the position of a man who, having knowingly married a consumptive wife, afterwards refuses to live with her. It is equally irrelevant to refer here to the old French tradition that callous English husbands habitually sell their wives at Smithfield market, but students of legal and social curiosities may care to be directed to a brief but interesting article on this subject from the learned pen of Prof. Courtney Kenny in the recent issue of the *Law Quarterly Review*.

MOORFIELDS EYE HOSPITAL.

ALL old Moorfields students will not only enjoy reading, but will desire to possess, the story of the hospital as told by Mr. Treacher Collins. The book [1] takes us back to 1805, when the "London Dispensary for Curing Diseases of the Eye and Ear" was opened in Charterhouse-square. This was practically the beginning of ophthalmology as a surgical specialty, Astley Cooper being, as it were, the godfather of the new institution, and John Cunningham Saunders its first surgeon. On the advice of the latter, the aural part of the work was soon dropped, and the name of the institution changed to "London Infirmary for Curing Diseases of the Eye." In 1811 the practice of the infirmary was opened to medical students, and thus was started the School of Ophthalmology, which has since become of world-wide renown. The original building was soon found to be too small for its requirements, and in 1822 a new building was erected in what was then called Lower Moorfields, on the outskirts of the city, the site now occupied by Broad-street Station being then an open space. Here practically all the older generation of ophthalmic surgeons in England received their training. The Princess Victoria became patron of the institution a year before her accession to the throne, and its name was again altered on this account to the Royal London Ophthalmic Hospital. The work quickly grew; the staff was gradually increased and the building extended, until it eventually became far too cramped for the work undertaken. In 1899 it was removed to its present quarters in the City-road, the old name "Moorfields," with the traditions attaching to it, still being in popular use. All this and much more Mr. Treacher Collins relates; he gives us thumb-nail sketches of many of the surgeons whose work has made the world reputation of the hospital. There are not many still living who can recall the personalities of the elder Critchett and Sir William Bowman. Jonathan Hutchinson, the elder, joined the staff at a somewhat later date, but resigned in 1878, the refraction work of the hospital having grown so arduous that he felt he could no longer carry out his duties. At that time, and for long afterwards, there were no paid refraction assistants at the hospital. Since it was impossible for the surgeons to devote their whole time to the work of testing for spectacles, they were largely dependent on the work of voluntary assistants, who were not all equally efficient. Many will recall the great days when Nettleship, Marcus Gunn, Tweedy, the elder Lang, J. B. Lawford, and Stanford Morton were on the staff. The book will do something to keep green the memories of these and of many others. There is much in it besides sketches of the personnel of the staff. The three great events of the Victorian epoch which affected all

[1] History and Traditions of the Moorfields Eye Hospital: One Hundred Years of Ophthalmic Discovery and Development. By E. Treacher Collins, consulting surgeon to the hospital. With 27 plates. London: H. K. Lewis and Co., Ltd. 1929. Pp. 226. 12*s*. 6*d*.

branches of surgery were the adoption of antiseptic—later aseptic—methods, the introduction of general anæsthesia, and the birth of the new science of bacteriology. From all three ophthalmology has received its full share of benefit, but the second became of relatively minor importance in this specialty after the discovery of local anæsthesia by means of cocaine. A still more important discovery made by Helmholtz, in 1851, was that of the ophthalmoscope, which first rendered possible the diagnosis of deep-seated affections of the eye. The pattern most generally used is still that to which the name of Morton is attached. The instrument led to the differentiation not only of the varieties of retinitis, choroiditis, and affections of the optic nerve, but inasmuch as the retina is morphologically an outpost of the cortex of the brain, it is of inestimable value to the general physician, and especially to the neurologist.

The influence of Moorfields on the outside world has been exerted not only through the students who have carried its teaching with them to all parts of the English-speaking world and to India, but also by means of the Ophthalmic Hospital Reports. This publication has appeared at intervals since 1857, and is now merged in the *British Journal of Ophthalmology*. Mr. Treacher Collins's scholarly book shows clearly to what extent the history of "Moorfields" is bound up with the development of ophthalmology as a science and art. It is enriched by portraits of most of the notable members of the past staff. The modest omission of a portrait of the author himself, whose term of office as surgeon lasted for 27 years, will be regretted by readers who find little else to criticise in the production.

CLEAN SWIMMING BATHS.

THE danger of the transmission of disease by polluted water in swimming baths has sometimes been exaggerated, but it does exist. This is the sane standpoint from which the Ministry of Health has approached the consideration of various methods of purifying bath water on a large scale, in order to advise which is the most practical, efficient, and inexpensive. Though there is no evidence to support alarmist rumours that epidemics have originated in swimming baths in this country, it is certain that pathogenic bacteria can remain alive in dirty bath water for considerable periods. It is therefore desirable that the water should be free from such bacteria and that its bacteriological count should approximate to that of drinking water. That this standard of purity can best be maintained by the method of continuous rapid filtration, combined with continuous chlorination and aeration, is the conclusion reached by officials of the Ministry, whose arguments in its support are set out in a pamphlet [1] signed by Mr. A. E. Sandford Fawsett, the chief engineering inspector; Mr. H. T. Calvert, the chemical inspector; and Dr. J. Alison Glover, one of the medical officers. The method has advantages over the fill-and-empty system, which was the only one in vogue during the nineteenth century, even when the water is changed daily, and is incomparably better than the treatment of the water by chemical means without filtration. The filtration plant, however, must be of adequate size, and the staff in control must be properly instructed in the technique of working it, and of testing (at least three times a day) the chlorine content, alkalinity, and clarity. The first of these can be easily determined by simple portable apparatus based on the orthotolidine test, a delicate colorimetric test first suggested by E. B. Phelp, and since improved, while the reaction should be kept at a pH of between 7 and 8—that is, just to show an alkaline reaction to methyl-orange. The reaction must be alkaline in order to neutralise the acids formed from the coagulant (alum or aluminoferric added to control the rate of filtration) and the chlorine, which is best supplied in the form of gas. It is almost impossible to get clear water unless the right alkaline reaction is maintained, and this is also important if complaints of smarting eyes are to be avoided. Smarting eyes may be caused by too much alum, too much lime, or too much chlorine; the symptom is attributed usually, but often incorrectly, to the chlorine.

The success of the purification in this system thus depends not only upon the design, sound construction, hardiness and accessibility of the plant but also on the care and skill of those operating it. Moreover, the prevention of unnecessary pollution from entering the water will greatly assist the operation of the purification plant. Whether the popularity of baths would survive the rigid enforcement of the suggestions made for the cleansing of a candidate and his costume before a swim remains to be seen. It is recommended that before entering the pool all bathers should take a shower bath as well as a foot bath, and that costumes as well as towels should be washed with hot water and soap and sterilised after use. The advice that the dressing boxes shall be commodious, well lighted and ventilated and easily cleaned will be welcomed, and also that they should be arranged so that the side walks are not used by bathers before undressing, other stands and galleries being provided for spectators. The concluding paragraphs concern the desirability of keeping detailed records of the hours during which the plant is working, the time taken to wash each unit, the power consumed for the filters only, the weight of each chemical used, and the amount of make-up water taken from the mains. Notes should be added daily on the alkalinity, clarity, and chlorine content of the bath water, on any unusual condition observed, and on any defects or difficulties experienced. Only by the study of such records will it be possible to learn which type of plant will show low running costs and at the same time require little attention.

[1] The Purification of the Water of Swimming Baths. H.M. Stationery Office. Pp. 52. 1s.

CHANGE OF BLOOD GROUP.

IT is accepted more or less as an article of faith that, once established, the blood group of the human being does not change. On general principles it seems unlikely that it should ever do so, but it must be admitted that few observations have been made on the groups of any large number of people over a long period, and that direct proof is therefore lacking. Recent observations by certain Japanese workers[1] afford fairly clear evidence that certain alterations in the group constitution of the blood may and do occur; but whether there can be an actual transmutation of group is another matter. These investigators record a number of cases in which, under the influence of acute infections and other toxic states, the constitution of the blood of the patients changed—so far as ordinary laboratory tests on the serum and corpuscles were capable of showing—from $A\beta$ or $B\alpha$ to $O\alpha\beta$; in other cases bloods accepted as $O\alpha\beta$ during the acute stage of illness developed either $A\beta$ or $B\alpha$ constitutions on convalescence. These observations do no more than bear out certain older ones to the effect that in ill-health the titre of the agglutinins and the sensitiveness of the agglutinogens may be lowered. But their moral is that mere examination of the serum and red cells by agglutination tests is not enough to determine a person's blood group for certain. The only way to be certain is to have recourse to cross absorption tests, and had such tests been used by the Japanese workers their results might have been different. In view of the close approximation of the calculated to the actual distribution of the blood groups on Bernstein's hypothesis it is hard to believe that the group constitution of the blood is not fixed early in life and transmitted according to Mendelian laws. But it will not neccessarily reveal itself in full to agglutination tests.

[1] Katsunuma, S., Kaneko, G., and Amagasa, S.: Proc. Imp. Acad. Jap., V. 7, July, 1929, p. 291.

THE SALE OF ARSENIC TO MINORS.

THE general secretary of the Horticultural Trades Association has questioned a statement in a recent annotation (THE LANCET, Oct. 12th, p. 780) on the sale of arsenic to the effect that arsenical weed-killers can be sold to boys of 16. He refers us to Section 2 of the Arsenic Act of 1851, the purport of which was stated in our article, to the effect that "no person shall sell arsenic to any person other than a person of full age." So far as there is any certainty in the interpretation of statutes, it would seem that this prohibition still stands. Section 17 of the Pharmacy Act of 1868 makes it clear that nothing in that Act is to repeal or affect any provision of the Arsenic Act of 1851. Similarly Section 2 of the Poisons and Pharmacy Act of 1908—the section which authorises the sale of arsenical or nicotine weed-killers by duly licensed persons—expressly saves the requirements of the Act of 1851. One would therefore be disposed to agree that the concessions as to the sale of weed-killers by general dealers have in no way negatived the prohibition in the 1851 Act against the sale of arsenic to persons under age, were it not that our learned contemporary, the *Solicitors' Journal*, whose opinion we quoted, appears to take a different view. Our contemporary's article was written by Mr. Marshall Freeman, the recorder of Stamford, a barrister with special knowledge of matters pharmaceutical. It may be that his observations were intended to emphasise the fact that, so far as the rules governing the sale of weed-killers are concerned, there is nothing to warn the distributor that he must not sell to a minor. His opinion, however, certainly seemed to justify the statement that such sales were legal. The doubt thus disclosed is a fresh indication of the unsatisfactory state of the law.

WE regret to announce the death of Dr. William Bevan-Lewis at the age of 82 years. Director for more than 25 years of the West Riding Asylum at Wakefield, and sometime Professor of Mental Diseases at the University of Leeds, he had long been living in retirement at Cardigan, his old home and birthplace.

OUR Medical Diary this week contains an abridged programme of the Conference on Mental Health to be held next week at the Central Hall, Westminster, under the auspices of the National Council for Mental Hygiene and the Tavistock-square Clinic, in association with many other organisations. Applications for tickets and other correspondence should be addressed to the Secretary of the National Council, 78, Chandos House, Palmer-street, London, S.W. 1.

As already announced, an informal "At Home" was held on Wednesday evening last, Oct. 16th, at 7, Adam-street, Adelphi, to inaugurate the removal of THE LANCET to its new home. The house being still empty the rooms were able to accommodate the large number of guests who responded to the Editor's invitation. The removal is now complete and the editing and publishing of the paper takes place from 7, Adam-street, Adelphi.

The number of students entered for the D.P.H. course at the London School of Hygiene and Tropical Medicine already greatly exceeds the earlier expectations of the director and the School Council. The special lectures for the Michaelmas term are all arranged for Mondays at 5 P.M. On Oct. 28th and Nov. 4th two lectures on Atmospheric Pollution will be given by Dr. J. S. Owens and Dr. Leonard Hill, F.R.S., respectively; on Nov. 11th and 18th Dr. Hill will speak on Sunlight and Health, and Clothing and Climate; and on Nov. 25th and Dec. 2nd Mr. J. C. Dawes will deliver three lectures on Disposal of Refuse. All these lectures are open to the public and we hope to publish in due course the programmes for the other terms of the academic year.

The Clinical Interpretation of Aids to Diagnosis.

A Series of Special Articles contributed by Invitation.

XLIX.

URETHRAL AND VAGINAL DISCHARGES.

ALTHOUGH the trained clinician can usually diagnose with some accuracy the cause of a urethral or vaginal discharge, and foretell within limits what the bacteriological findings are likely to be, the assistance of an expert bacteriologist is of definite value. Without laboratory methods gonorrhœa cannot be definitely established nor excluded as the cause of the discharge. Microscopical examination of the urethral and cervical smears is, moreover, helpful as a means of assessing the effects of treatment and of judging improvement in this disease.

Technique of Collecting Samples.

For the examination to be of value to the clinician, it is essential that the material for examination should be taken correctly; much waste of time is incurred by submitting indifferently or carelessly taken specimens for investigation. The gonococcus is seldom found in large numbers in the female genito-urinary tract, and it is an organism which possesses little tenacity of life when removed from its normal habitat. These two facts form the basis of the technique of film and culture taking in modern venereal clinics. In chronic cases positive results are more likely to be obtained immediately after cessation of the menstrual flow. If cultures are desired it is important to avoid delay in transferring the culture tubes to the incubator. Not more than one hour should elapse between the collection of the sample and the introduction of the tube into the incubator.

For the collection of the pus the patient is placed, for preference, in the lithotomy position, and a beam of light from a head lamp or from other suitable source is focused on the vulva.

The *urethral sample* should be taken as long as possible after the patient has last passed urine. The ideal is five hours and upwards after micturition, but this time cannot always be allowed to elapse since frequency of micturition is a feature of some cases in which bacteriological examination is required.

The labia being held apart, the vulva is swabbed from before backwards, in order to remove the possibility of contamination with vulval organisms. Since the favourite resting place of the gonococcus is in the higher reaches of the urethra that channel should be milked from above downwards through the anterior vaginal wall by means of a gloved finger. The sterilised platinum loop is then introduced into the urethra and subsequently smeared on to a glass slide, or on to the hydrocele-fluid agar, or other suitable medium, if a culture is desired.

Vaginal films, or cultures, are of little value in the adult, except possibly in virginal vaginæ; indeed it is of the utmost importance to avoid contamination of the cervical smear by vaginal organisms, which are apt to lead to confusing results. It is most unlikely that the gonococcus will be found in the vaginal pus of adults, while there exist in this situation other organisms which may be mistaken for it.

Cervical films.—In all cases of purulent vaginal discharge, except in young children, the material to be examined must be taken from the interior of the cervical canal. The cervix is exposed with a bivalve or other speculum which will ensure exclusion of the vagina. The fornices and the vaginal cervix are then mopped dry with gauze swabs on holders, the sterile loop is introduced into the canal of the cervix, and the

material thus collected is smeared on to a glass slide or culture medium. If preferred, the ordinary cotton-wool throat swab on a stilette may be used in place of the platinum loop; but if this is used there must be no delay in smearing the slide or culture medium.

Bacteriology.

The *gonococcus*. The finding of an *intracellular*, reniform, Gram-negative diplococcus in this situation is positive evidence that the patient is suffering from gonorrhœa. The finding of *extracellular* characteristic diplococci is, in the overwhelmingly large majority of cases, positive clinical proof that the gonococcus is the infecting organism. It is worthy of note that a positive urethral result is of more value than a positive cervical film. For medico-legal purposes both the meningococcus and the *Micrococcus catarrhalis* should be excluded by their different fermentative reactions. The gonococcus can often be identified by culture, although the smears have failed to yield a positive result.

The *staphylococcus* is commonly found. Occasionally cases of profuse purulent vaginal and urethral discharges are met in which this organism is found alone or in association with diphtheroid bacilli. If repeated examinations fail to reveal the presence of the gonococcus, a diagnosis of staphylococcal urethritis or cervicitis can be made. Such infection is apparently not communicable to the male and rapidly responds to treatment. But the chief importance of the staphylococcus lies in the fact that in its degenerate forms, which have lost the capability of taking Gram's stain, it is sometimes confused with extracellular gonococci. These degenerate, Gram-negative staphylococci are to be distinguished from gonococci by being members of a group, the majority of which are Gram-positive. Their morphology when dividing is, moreover, characteristic.

The *colon bacillus*. Like the staphylococcus, this organism is frequently found in films, particularly in those made from the urethra. It may be the cause of urethritis, the infection being of hæmatogenous origin, and arising as a primary infection in the pelvis of the kidney, or in the bladder as the result of the passage of an infected catheter. In its atypical coccoid forms it may be mistaken for the gonococcus; but in such cases typical bacteria will be seen as well and all gradations in size exist, from the Gram-negative bacillus to the atypical coccoid types. The coccus, moreover, is of larger size than the gonoccocus, and does not possess the typical reniform shape.

The *streptococcus*, in various forms, is found with considerable frequency, especially as a secondary invader, in cases of gonorrhœa, and, of course, in primary streptococcal vaginitis, cervicitis, and urethritis. If the lesion is a *vaginitis* as distinct from a *cervicitis*, the causative organism is almost always the streptococcus. When the urethra is affected the urethritis is associated with cystitis or pyelitis, while in cervicitis streptococci are frequently found in the presence of post-parturitional cervical lacerations. There is little clinical difficulty in differentiating between the infected cervical laceration and the gonococcal erosion of the cervix. The short-chained variety of streptococcus is the commonest. The identification of the hæmolytic streptococcus during pregnancy is of great importance. Its association with puerperal septicæmia is well recognised, and has recently been stressed by H. Burt-White.

The *bacillus of Döderlein* is a large Gram-positive bacillus, often present in the vagina. It does not grow on the ordinary culture media, and it has no pathogenic properties.

Other organisms.—In cases of tuberculosis of the genital tract, excluding primary tuberculous salpingitis, the *Bacillus tuberculosis* may be present in the cervical smears, while, in cases of tuberculosis of the urinary tract, this organism may be found in those from the urethra. In either case it must be distinguished by its acid-fast properties from the smegma bacillus. The *Klebs-Löffler bacillus* is found in the rare cases of aphthous vaginitis. *Diphtheroid bacilli* are relatively common in the vagina, and possess no pathological significance. The *thrush* infection is again rare, but may be surmised in those cases possessing the well-known appearance of oral thrush. Films will show the presence of oidium albicans. The *pneumococcus* is uncommon. It is an occasional cause of hæmatogenous or descending urethritis. In children between the ages of three and ten years the alkaline vaginal reaction and the increased size of the lumen of the vagina make this passage the *via portialis* in cases of primary pneumococcal salpingitis, which, as McCartney and Fraser have shown, is the almost invariable antecedent of pneumococcal peritonitis.

Cytology.

Normally shreds of mucus and squamous epithelial cells are found. The only cellular elements other than these result from inflammation, from ulceration, and from tumour formation.

Inflammation produces excessive desquamation, with increase in the squamous epithelial cell content and the presence of pus cells. In the absence of a positive gonococcal culture, the presence of a preponderance of pus cells over epithelial cells, taken in conjunction with suggestive clinical findings, is sufficient to warrant the institution of the treatment for chronic gonorrhœa.

Ulceration.—The findings in this case are pus, blood, and epithelial debris, which may be in clumps. The causative organism will also be found.

Tumour formation.—The malignant growths of the cervix—carcinoma and sarcoma—produce a blood-stained vaginal discharge in which epithelial and connective tissue elements respectively may be found in conjunction with pus and blood cells. By the time carcinomatous or sarcomatous cells make their appearance in the discharge the growth is almost invariably of such dimensions and of such characteristic nature that it can be diagnosed by ordinary clinical methods. The growth at this stage is always secondarily infected. In patients over 50 years of age the possibility of a discharge being due to carcinoma of the body of the uterus must not be overlooked. The findings are similar to those in carcinoma of the cervix, but the secondary infection is usually not so heavy.

Discharges in Children.

In adults the causative lesions, in the majority of cases in which the patient complains of a discharge are urethritis and cervicitis, occasionally vaginitis. In children, on the other hand, the lesion is vulvo-vaginitis. Any of the organisms previously mentioned may be found, particularly the pyogenic bacteria in cases owing their origin to uncleanliness or to the presence of foreign bodies. Parasites and thread-worms are sometimes found, while the disease occasionally occurs as a complication of one of the acute specific fevers. The only place in which the gonococcus is likely to be found is in the vaginal or vulval discharge, whereas in adults the urethra and the cervix are the most likely sites. A determined search must be made and if the bacillus is found a real effort should be instituted to examine all the other members of the family.

The mode of infection in children is sometimes, but not always, by rape. Vulvo-vaginitis spreads rapidly in a family of poor children, and occasionally in a school. Infection in such cases is probably conveyed by the use in common of washing utensils, towels, sponges and lavatories, or by several members of a family sleeping in the same bed.

Discharges during Pregnancy.

It is well known that during pregnancy there is an increase in the physiological secretions; similarly, all pathological discharges become accentuated. The two important organisms for which repeated search

should be made are the gonococcus and the hæmolytic streptococcus; the former on account of the danger of ophthalmia neonatorum, the latter because of its relationship to puerperal septicæmia. Primary staphylococcal infections are not uncommon during pregnancy, and give rise to a very profuse discharge which, as has been mentioned, is of relatively little importance.

Criteria of Cure.

A patient can be judged cured of gonorrhœa when, in the absence of all clinical evidence, notably vaginal discharge, the bacteriologist fails to find gonococci in films and cultures from the urethra and cervix on three successive occasions at monthly intervals. It is advisable to conduct a fourth examination two to four months later. Judged on this basis the treatment of gonorrhœa in the female yields very promising results, but the criteria can only be fairly applied to those patients who attend regularly, not to say enthusiastically, for treatment, and who obey to the letter the instructions they receive concerning, for example, marital relations, alcohol, and other excesses. Pessimism is only justified if it takes these factors into account. The reputation of every clinic suffers from the patient who, finding her daily visit irksome, begins to attend less and less frequently, and finally ceases to attend at all. Some patients find it impossible, for fear of detection, to carry out advice. Others are married to husbands who refuse treatment. And so on. There are a hundred and one reasons why a woman cannot do as she is bid. The same reasons explain, and to some extent justify, pessimism.

The complement-fixation test is unreliable, and all authorities are agreed that provocative vaccines are valueless as a means of assessing cure in the female.

From the point of view of cure cases fall into three groups:—

(*a*) Cases in which, clinical manifestations being absent, three successive bacteriological examinations fail to reveal the presence of the gonococcus. Clearly nothing requires to be said of this group.

(*b*) Cases in which repeated bacteriological examinations fail to demonstrate the presence of gonococci, but in which a chronic discharge persists. Secondary invaders, streptococci or staphylococci, are frequently found in considerable numbers, while the discharge contains a high percentage of pus cells. Patients in this group cannot be taken as cured, and the discharge must continue to be regarded as gonococcal, provided the gonococcus was found in the films or cultures at some past examination, however long ago. Repeated search by a skilled clinician working in conjunction with a skilled bacteriologist will, in the large majority of cases, be rewarded with success, and the gonococcus will be found even after a long series of negative examinations. The power of secondary invaders to maintain or to cause a recrudescence of the discharge is extremely dubious. If treatment has effectively eradicated the gonococcus the secondary organisms will have perished. Failure to find the gonococcus usually is due to the fact that the organism lies buried in the deeper crypts and so eludes detection, unless the utmost care and patience are observed in taking the material for examination and in the examination of that material.

(*c*) Cases in which clinical manifestations cease and in which bacteriological examination is negative on three successive occasions, but in which the discharge, with or without other symptoms and signs, reappears at intermittent intervals. Such cases are very similar to those described in the previous paragraph. The gonococcus, if carefully sought, should be found. When not due to reinfection, such a discharge is, as in the male, usually due to some exciting excess, alcohol, chill, intercourse, and the like.

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Special Articles.

THE BROWN *v.* WHITE BREAD CONTROVERSY.

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AND

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So far the brown versus white bread controversy has engendered more heat than light. The upholders of brown bread maintain that brown bread is better than white because it contains more protein of a higher biological value,[1] more vitamin B 1 [2]—the antineuritic vitamin—more mineral matter,[3] and more roughage.[4] The protagonists of white bread, while admitting all these points, maintain that an ordinary mixed diet contains so much of these commodities that the deficiencies of white bread are amply compensated[5] and point to the overwhelming instinct of the working classes (which, of course, may be mere prejudice) in favour of white bread as mute and inarticulate evidence of its dietetic value.

The controversy has been complicated by the advent of patent germ breads which have relatively large proportions of the germ of wheat (obtained from the milling of white flour) added to the white flour from which they are made. Such breads contain still more protein of higher biological value, more antineuritic vitamin (B 1)[6] and more toxamins,[7] the poisonous substances discovered in cereal germs by Edward Mellanby. Such toxamins necessitate the addition of more fat-soluble vitamins to counteract their poisonous influence—i.e., demand more milk and butter in the diet, things which the working classes are wont to deny themselves. A still further complication has been introduced by the recent separation of vitamin B [8] into two moieties, B 1 (the antineuritic vitamin) and B 2 (the antipellagric vitamin), and our consequent lack of knowledge of the distribution of these in foodstuffs other than wheat germ and yeast in which their presence has been fully investigated. The adumbration of still further moieties [9] of vitamin B renders the problem still more involved.

At the present it may be taken as certain that brown—i.e., wholemeal—bread contains more protein of good biological value, more vitamin B 1, more mineral matter, more toxamins, and more roughage than white bread, while it contains approximately the same amount of vitamin B 2.

It is very difficult arguing from these data to assay the value of these three types of bread in human nutrition: in fact it may be said at once that nothing but experiments made directly upon human beings will be satisfactory or acceptable to either group of protagonists—long and costly experiments on the lines of those made under the auspices of the Medical Research Council and the Ministry of Health by Dr. Corry Mann [10] upon the value in nutrition of milk. We venture, however, to report an experiment made upon the respective values of brown and white breads incorporated in a mixed diet based upon the analyses of the diet of agricultural labourers in Essex [11] when fed to the laboratory rat.

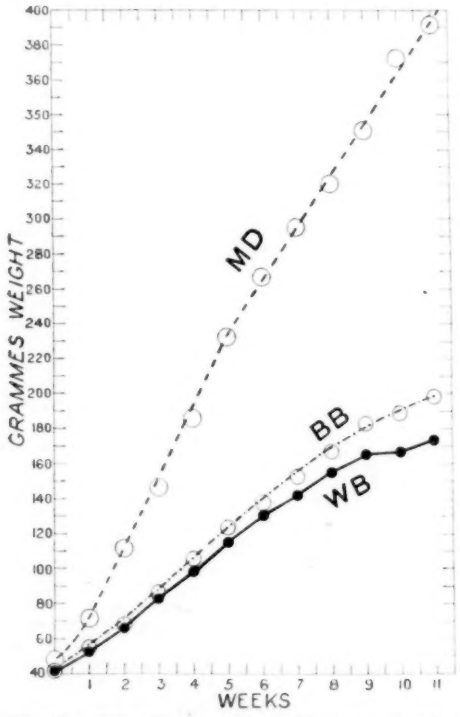
Experimental Diets.

The diet in question comprised meat, potatoes, vegetables such as beetroot, cabbage, carrot, cucumber (raw), lettuce (raw), green peas, tomato (raw), turnip, sugar, bread, cheese, margarine, lard, milk, bacon, and eggs. The proportions were chosen so that they tallied as nearly as possible with the amounts of these foods used by agricultural labourers. The interpre-

tation of "other vegetables" [11] was left to the discretion of the assistant who was in charge of the animals. The amounts used were in the proportion of meat 10 parts, potatoes 59, vegetables 16, sugar 11, bread 95, cheese 2·5, margarine 4·5, lard 2, milk 20 (by volume), 170 (by volume) of water. Streaky bacon was given twice a week instead of meat and one-quarter of an egg per week beaten in a known portion of the milk and pipetted off. The vegetables were cooked with salt as is usual, the potatoes being cooked separately. The raw vegetables were chopped finely, the tomatoes being skinned first by pouring boiling water over them.

As the food was served ad lib. in the special feeding dishes devised by one of us (G. A. H.) it had to be prepared in the form of a finely divided pulp so that there was no chance of the animals, taking more of one thing than another. The method adopted was as follows: the weighed meat and cheese together with five parts of water to one of meat, and a pinch of salt, were heated in the inner compartment of a double saucepan, with rapidly boiling water in the outer, till the meat turned colour (i.e., it was very lightly cooked). During this short period the mixture was rapidly and constantly stirred. This breaks up the meat into tiny fragments. Into the mixture the fat was stirred. Then the bread was added. The sugar was dissolved in 120 parts of water and poured rapidly over the bread. The mixture was well beaten. The vegetables, which had been previously

FIG. 1.



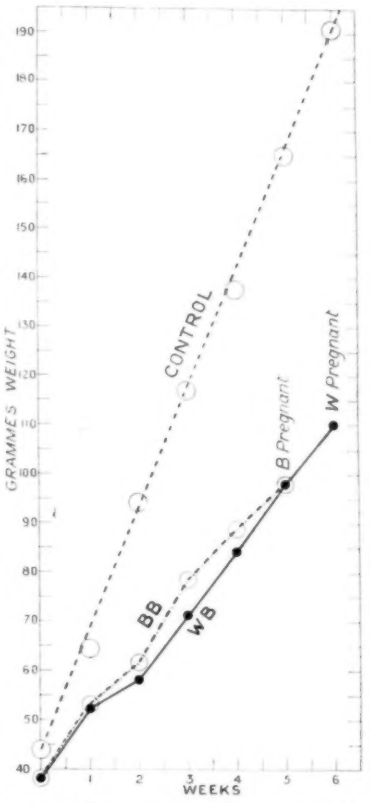
The growth curves of male rats upon the brown bread (B.B.) and white bread (W.B.) diets respectively, with a control curve of the rate of growth of normal male laboratory animals (M.D.) at the same period of the year.

cooked and thoroughly disintegrated, were added and the whole again beaten together. Last of all the milk, with or without the portion of egg, was added with further beating. When raw vegetables were given they were incorporated with the mixture at the end.

The total amount of mixed food was adjusted to the appetites of the animals, enough being given to leave a small surplus each day.

Twelve animals were used in each experiment, six bucks and six does. One group of 12 were fed on a diet with white bread and the other with brown bread in the mixture. Each buck on the white bread diet was matched against a litter brother of the same weight on brown, and each doe with a litter sister. The average weight was therefore identical and the litter control complete. The animals were three weeks old at the beginning of the experiment and weighed 40·7 g. (bucks) on the average and 38·3 g. (does) respectively. The experiment ran for 77 days for the bucks and until 10 of the 12 does had produced a litter. The animals were weighed and carefully inspected every day and the growth curves of the males and females are given separately in Figs. 1 and 2. As a control in each case the average growth rates of the stock laboratory animals, male and female respectively, on a mixed middle-class diet are also given.

FIG. 2.



The growth curves of female rats upon the brown bread (B.B.) and white bread (W.B.) diets respectively, with a control curve of the rate of growth of normal female rats at the same period of the year.

Inspection of the curves shows that the males receiving the brown bread diet grew somewhat more rapidly than those on white, though both sets are far behind the normal growth rate on a middle-class mixed diet. This slight advantage in favour of the brown bread diet for males tallies with the results of earlier work.[12 13] Between the females on the brown bread diet and those on the white there is little to choose. When the experiment closed the weights were almost identical in each set, but at intermediate points there had been a slight advantage in favour of the brown bread diet. Moreover, those on the latter diet littered a week earlier than those on the white bread diet.

Condition and Habits of Dieted Rats.

The most that can be claimed for these growth curves is that the substitution of brown for white bread appeared to improve this diet though it brought it by no means near the value of a middle-class diet. This improvement may easily have been due to the coprophagy which developed in those on brown bread (vide infra), for other criteria counterbalanced this increased growth rate.

The routine inspection of the animals showed as regards their physical state the usual signs of defective nutrition, especially the slow growth, the loss of hair (later partly regained), and the lightening in tint of the black patches to grey or fawn previously described.[11] At the end of the second week the hair had begun to fall and this was more noticeable in those on the brown bread diet than those on the white. At the end of the fifth week the lack of colour of hair was seen, and again the brown bread animals suffered more than the white. The hair was normal in quantity in neither set of animals at the end of the experiment. Nine animals on the brown bread diet

and two on the white showed incipient xerophthalmia. The teeth were poor, dull, and opaque in appearance, and worse in those on the brown bread diet. Both sets of animals had the prematurely aged appearance of rats on a poor diet.[15]

A striking difference in habits between the two sets was also observed. Those on the brown bread were highly nervous, refused to come at call, and threatened to bite. They needed the more careful handling. Moreover, they showed a desire to consume both the liquid and solid excreta of their fellows, and in time developed an extraordinary cleverness in obtaining such excreta in spite of the usual technique of the use of screens. They waited for the excreta, even removing solid matter from the anal canals of the others before it had time to be voided and fall out of reach. This curious phenomenon appeared at the end of the sixth week in those on brown bread. Three weeks later signs of it, though to a much smaller extent, were seen in those on the white bread diet. Such nervous and gustatory habits have never been seen before in this laboratory in an experience extending over 3300 litters with about half that number of feeding experiments. They lead to the suspicion of a lack of, or more probably an imbalance between, food factors in the brown bread diet.[16]

Summary.

The substitution of brown bread for white in a diet made up to approximate to that of the Essex agricultural labourer, when fed, in carefully controlled experiments, to the laboratory rat, resulted in but small increase in growth and was accompanied by physical and nervous symptoms and by habits pointing towards a lack of, or imbalance between, food factors in the brown bread diet. The experiments give but little support to the propaganda for brown bread in the diet of the working classes.

The cost of these experiments was defrayed by a grant from the Medical Research Council.

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THE LONDON MEDICAL EXHIBITION.

THIS exhibition, which for many years has been held at the Central Hall, Westminster, has so grown both in regard to the number of exhibitors and in attendance that the organisers have been compelled to move to larger premises—namely, to the New Hall of the Royal Horticultural Society in Greycoat-street, Westminster. The exhibition closed at the end of last week after a record attendance of medical men both from this country and from overseas, who were enabled thus to measure the progress which has been made in the production of drugs and in the improved excellence of British-made surgical instruments. In the space at our disposal it is possible to mention a part only of some 170 stands, while drugs, foods, and surgical instruments so overlapped—some of the exhibitors catering for several branches of medicine and surgery—that only a general classification can be made.

DRUGS AND PHARMACEUTICAL PREPARATIONS.

BURROUGHS WELLCOME AND CO. (Snow Hill-buildings, London, E.C.), in an attractive exhibit, prominently displayed "Tabloid" Alkaline Compound Effervescent, a therapeutic agent which may be used (1) as an antacid draught, (2) to correct hypo-alkalinity associated with gastric disturbance of various kinds, or (3) to restore the alkaline balance and assist remineralisation in the condition now known as acidosis; "Kepler" Malt Extract, an important source of vitamin B, and "Kepler" Cod-liver Oil with Malt Extract presenting vitamins A, B, and D in their natural form and association; and "Tabloid" Brand Hypodermic Bulbocapnine Phosphate, an adjunct to the treatment of certain phases of epidemic encephalitis. A mortality chart recorded the results of insulin treatment on 1316 patients and indicated how case-fatality has decreased as a result of improved technique.—MAY AND BAKER, LTD. (Battersea, London, S.W.), had a large display of drugs, including Novarsenobillon ("914") for all stages of syphilis and valuable also in yaws, malaria, rat-bite fever, and anthrax; Metarsenobillon, a water-soluble arsenobenzene derivative specially recommended for use by intramuscular or subcutaneous injection; Mercurochrome-220 Soluble, a powerful antiseptic of great penetrative power and low toxicity; and Arthrytin Ammonium orthoiodoxy-benzoate in capsules for oral administration, and powder for intravenous and rectal injection in the treatment of chronic arthritis.—THE BRITISH DRUG HOUSES, LTD. (Graham-street, London, N.), exhibited a number of their interesting products, new additions being Acetylcholine for the treatment of arterial hypertension and Iodised Tincture of Guaiacol. Attention was particularly drawn to Radiostoleum which is used as a substitute for cod-liver oil and which, it is claimed, has anti-infective properties. Radiostol and Radio-Malt were also shown.—PARKE DAVIS AND CO. (50–54, Beak-street, London, W., and Hounslow) had a display of drugs which attracted much attention. Their exhibit included a new preparation called Citronin for the treatment of asthma and catarrhal conditions; Estrogen, a hormone-containing substance for the stimulation of the female reproductive organs; Immunogens, a series of antigens including "catarrhalis," "gonococcus," "pertussis," "pneumococcus," "staphylococcus," and "streptococcus"; drugs for the injection treatment of internal hæmorrhoids, and panteric tablets for use in conditions associated with pancreatic deficiency.—BAYER PRODUCTS, LTD. (19, St. Dunstan's-hill, London, E.C.). A selection of the well-known Bayer products including Avertin, a basal narcotic administered per rectum which maintains a state of basal anæsthesia through dosage calculated on the body-weight; Compral, a recently introduced analgesic; Phanodorm, an hypnotic; and Theominal, for reducing high blood pressure in arterio-sclerosis, were shown.—H. R. NAPP, LTD. (3 and 4, Clement's-inn, Kingsway, London), among other preparations showed Anzypan, a new product intended for the treatment of dyspepsia, embodying both gastric and intestinal enzymes in a form which ensures the release of the gastric enzymes in the stomach and of the intestinal enzymes in the bowel. Put up in the form of "a tablet within a tablet," the interior tablet contains intestinal ferments and is surrounded by a coating which is only soluble when in contact with the alkaline medium of the bowel; Normacol, an intestinal evacuant of vegetable character which gives both bulk and emollience, and thus ensures regular function; Ephetonin, a synthetic ephedrine for the oral treatment of bronchial asthma, hay-fever, and allergic conditions; and Bulbocapnine, an alkaloid of *Corydalis cava* for the treatment of

hyperkinetic conditions (paralysis agitans, chorea, &c.). It has also been found of value in the treatment of behaviour disorders of children in post-encephalitic conditions (vide an article in THE LANCET, May 11th, by Dr. T. R. Hill).—THE HOFFMANN-LA ROCHE CHEMICAL WORKS, LTD. (51, Bowes-road, London, N.), showed a series of preparations including Allonal allyl-isopropyl-barbiturate of dimethyl-amino-antipyrine, a synthetic, non-habit-forming hypnotic and analgesic, which relieves pain and gives sleep, not only in nervous insomnia but in pain insomnia. It contains no morphine, heroin, or opium derivatives; Omnopon, an opium derivative in which the whole of the opium alkaloids are presented in the form of soluble hydrochlorides; and Sedobrol, sedative bouillon in tablet form.

ALLEN AND HANBURYS, LTD. (Bethnal Green, London, E.), had an imposing display of their various drugs and foods including the well-known "Byno" series of tonics: Pitibulin, pituitary (posterior lobe) extract; Crismol, a pure medicinal paraffin; liver products for the treatment of pernicious anæmia; and Cremor Alkalinus for the intensive alkaline treatment of gastric and duodenal ulcer. It is prepared in two forms: (*a*) sod. bicarb. 2 parts; mag. carb., 4 parts; calcium carb., 4 parts; bismuth carb., 1 part; and (*b*) sod. bicarb., 2 parts; mag. carb., 3 parts; calcium carb., 4 parts; bismuth carb., 2 parts; where formula (*a*) proves to be too laxative in effect, the proportion of magnesium carbonate being decreased and that of bismuth carbonate increased.—VITAMINS, LTD. (38, Danemere-street, London, S.W.), exhibited their vitamin food Bemax, which is prepared from the embryo of cereals and possesses a high concentration of B-vitamin as well as a large amount of E-vitamin, and is indicated in constipation, rheumatism, depression, and gastric and duodenal ulcers. It can be taken in milk or in any breakfast food, or eaten with soup or stewed fruit.—PROMONTA CO., LTD. (127, Regent-street, London, W.), showed New-Promonta intended to stimulate the general metabolism and increase the calcium and phosphorus content of the blood. The preparation contains the lipoids of the central nervous system with vitamins A, B, D, and E, lime, iron, hæmoglobin, and soluble lacto-albumins and carbohydrates. It is indicated in neurasthenia, fatigue, insomnia, malnutrition, and conditions of functional insufficiency. FASSETT AND JOHNSON, LTD. (86, Clerkenwell-road, London, E.C.), presented a wide selection of medical and pharmaceutical products including Phyllosan, pharmacological chlorophyll for use in anæmia, debility, convalescence, and all forms of wasting diseases and cardiac affections. Medicinal plasters, dressings, and surgical requisites were also displayed, and attention was particularly drawn to Mead's rubber adhesive plaster which is wound in various widths on a common spool.—PEARSON'S ANTISEPTIC CO., LTD. (61, Mark-lane, London, E.C.), exhibited Hycol, a strong germicidal disinfectant with low toxicity prepared from coal-tar oils, which has a Rideal-Walker coefficient for *B. typhosus* 18–20. It is suitable for dental, medicinal, and surgical uses. Iodine-Medol, a non-toxic and non-irritant antiseptic ointment, was also shown.—SCHERING, LTD. (3, Lloyd's-avenue, London, E.C.), made prominent Veramon, an analgesic whose pain-relieving effects, especially post-operative pain, were emphasised; Atophan, a remedy for gouty and rheumatic conditions; and Medinal, a hypnotic and sedative with absence of cumulative effect; and Vasano, for the prophylaxis and cure of train-, air-, car-, and sea-sickness, also received attention.—HOWARDS AND SONS, LTD. (Ilford, near London), made a special feature of their standard Ether manufactured from duty-free rectified spirit, which is sold at the same price as was formerly charged for ether made from rectified spirit. Agotan Ointment was also prominently displayed, and many fine chemicals such as quinines and quinine derivatives, aspirin, calomel, calcium lactate, and so forth.

(*To be continued.*)

THE OLYMPIA MOTOR SHOW, 1929.

(FROM A CORRESPONDENT.)

THE 1929 Motor Exhibition at Olympia provides striking evidence of the efforts of the manufacturers:

(1) To allow for the average man's dislike of giving his car periodic attention. Maintenance jobs, such as "greasing-round," have in the past been a much shirked duty and are now being largely eliminated or at least simplified.

(2) To make the sensation of motoring more luxurious. This he does by providing smoother running engines and improving the springing.

(3) To take discomfort out of motoring, by better seating accommodation and by efforts to prevent the entry of engine fumes into the saloon body, and so to abolish the saloon headache.

(4) To provide the motorist, as standard fittings, with devices which have until recently been considered accessories to a car, notably radiator shutters, bumpers, and safety glass.

These tendencies are of special interest to the doctor, who has less opportunity than most other professional men to set aside regular occasions to give his car attention; if he neglects the rite of the grease-gun, he is showing the average man's dislike of a thoroughly disgusting job with much more excuse. When the doctor is an owner-driver his car is liable to be neglected, and any action of the motor-car designer to eliminate the penalties of that neglect is therefore acceptable. Certain labour-saving developments are recorded below.

The general refinement of performance in the 1929–30 models is noteworthy. The outstanding characteristic of the Show is the increased use of the six-cylinder engine, and this is a distinct advance towards sweeter running. A year ago the number of makes of car on the market compared as follows: 34·6 per cent. with four-cylinder engines, as against 49·6 per cent. with six-cylinder engines. To-day the difference is: 26·8 per cent. "fours" and 52·5 per cent. "sixes." Six-cylinder cars can now be obtained at prices from £190 and with a horse-power of from 12 upwards. Improvements in suspension are also noticeable and are due to detail alterations to springs and shock absorbers.

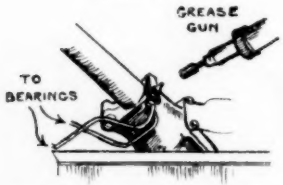
Less Noise and Better Ventilation.

Further, to lessen the fatigue of one who has to spend many hours daily in a car, efforts are being made to reduce the noise which frequently emanates from the gear-box. Four-speed gear-boxes are becoming more popular than three-speed boxes, and on some of the cars at Olympia four-speed boxes are provided in which the third speed is claimed to be as quiet as the top gear. These include Graham-Paige and (which were so equipped last year) Humber, Chrysler, Delage, Darracq, Riley, and the new M.G. Advance in gear-box design is also bringing about easier gear changing. The 12 h.p. Austin, for example, is now much easier to change between third and top gears. The admirable "self-changing" gear-box is again shown by the Armstrong Siddeley Company. This is fitted as an extra on the 20 h.p. and 30 h.p. models, but eventually, when factory arrangements permit, this box will be available for all the models. This company is now making only six-cylinder cars, the smallest of the range being the 12 h.p. model, the saloon price of which is £285.

It is extraordinary that in an age when the importance of abundant fresh air and sunshine is receiving unprecedented public recognition, the open motor-car body should be apparently on the verge of extinction. At Olympia this year there are fewer open bodies on view than ever, and most of those displayed are on sports types. Few saloons, however, are adequately ventilated, and on a long journey the choice is frequently between a draught and a headache. The fumes from the engine, which tend to percolate into the body, appear to affect different people in different

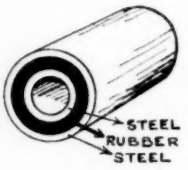
degrees, but to some a journey of 50 or 100 miles in a saloon car (unless it be in one of the rare well-ventilated types) causes general malaise. If some designer would seriously turn his talent to producing a really leak-proof, non-rattle, inexpensive and rapidly erected hood, possibly open cars would come back into general favour. Meanwhile, on the new 16 h.p. six-cylinder Singer (which takes the place of the previous Senior model, and is the lowest

FIG. 1.



Nipple on the steering column of the Swift, for greasing ten points simultaneously.

FIG. 2.



A Silentbloc bearing.

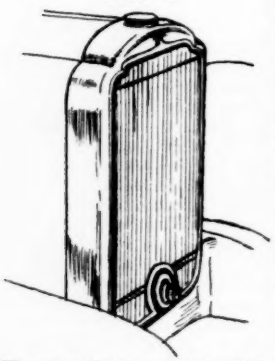
price British six-cylinder car, at £275 for the saloon) glass ventilator panels are provided over the windows. The 2/3 seater (Fig. 6) is £240. An ambitious effort to improve the atmosphere inside a saloon car is to be found on the new 15 h.p. Morris Oxford Six (saloon £285). The engine of this car is equipped with a device enabling it to consume its own fumes.

The sunshine roof, if carefully designed, is a useful compromise between the saloon body and the advantages of the open car. Its popularity continues. The Singer design has dropped out, but other makers have improved their designs.

Easy Starting.

The gradual tendency to provide radiator shutters as a standard fitting is welcome. For a doctor who makes journeys involving frequent stops the provision of radiator shutters is essential. The function of these shutters is to keep the temperature of the engine at the most efficient point as nearly as possible, and so to ensure easy starting in winter time. Radiator muffs may be used for this purpose, but they are not nearly so satisfactory as shutters which are either automatic or controlled by hand from inside the car. Automatic shutters, which are to be preferred, are operated by a thermostat which causes them to open in proportion to the increasing heat of the engine and to close the shutters as the engine cools down.

FIG. 3.



The new Buick radiator, with automatic shutters.

Easy starting is essential to the doctor, and the vogue of coil ignition is therefore important. The magneto system is rapidly losing its popularity, and 60 per cent. of the cars now on the British market employ coil ignition. This is reverting to the system of many years ago, and because motorists in those days had a great amount of trouble with their coil ignition this system is having to overcome a good deal of prejudice. Coil ignition to-day, however, is greatly improved. Its early defects have been cured, and the fear of being stranded owing to failure of the car battery (on which the ignition system depends) need not be entertained with modern batteries, so long as they receive reasonable attention. Coil ignition gives some slight improvement in easy starting and slow running compared with the magneto system.

Easy Greasing.

The 12 h.p. and 16 h.p. Austins employ one of the systems to simplify chassis greasing. The shackles of the road springs are fitted with Silentbloc bushes (Fig. 2), in which hard rubber is sandwiched between the fixed and moving elements of each bearing, so that no lubrication is required between them. The rubber has to take the stress of the constant flexing of the bearing, but according to the makers this torsion has not had any deleterious effect on the rubber during the two or three years that these bearings have been on the market. This year Silentbloc bushes have jumped into popularity, and they are now fitted to A.C., Austin, Alvis, Ascot, Citroen, H.E., Hillman, Humber, Riley, Rover, Standard, Talbot, Trojan, and Triumph cars. They do not, of course, eliminate the job of "greasing round," but they greatly reduce the number of greasing points.

Another and more complete method of tackling the greasing problem is illustrated, among others,

FIG. 4.

The Vauxhall 20/60 Velox Fabric Saloon.

on the Singer Super Six. This car has a larger engine than the new six-cylinder model, but the tax is the same (£16). One-shot chassis lubrication is fitted; in this system all the greasing points on the chassis (hitherto lubricated by hand with a grease gun) are connected by piping to a central oil reservoir. By depressing a pedal which operates a plunger in this reservoir, oil is forced to all the points. The price of this saloon is £350.

On the interesting redesigned 40/50 h.p. Rolls-Royce one-shot lubrication is provided to all the chassis bearings except those on the two axles, which are connected by piping to a single accessible grease-gun nipple. This decentralised system has been used in order not to involve the use of flexible tubing between the chassis and the axles.

The redesigned Swift shows how, on a lower price type of car, some of the benefits of one-shot lubrication may be obtained without going to the expense of the complete system. On this much improved car the ten most inaccessible bearings are connected to one central greasing nipple at the foot of the steering column (Fig. 1). The grease gun has to be applied to this nipple, while the more accessible points are greased with the gun in the usual way. The saloon is £260.

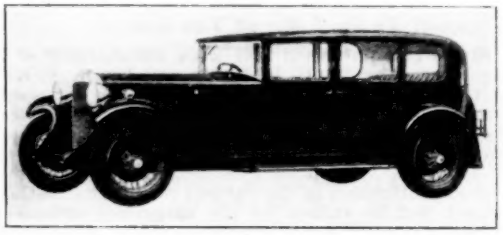
The Buick represents another method. On this car the greasing is by grease gun, but the nipples are grouped together in a small number of accessible places, each nipple being connected to its bearing by piping. The 1930 Buicks have a number of improvements. Automatic radiator shutters are included in the specification (Fig. 3). These cars are big and powerful, the six-cylinder engine being rated at 28·4 h.p. The sportsman's coupé displayed at Olympia is an attractive car in which the doors are not too wide (£535). The saloon is £485.

One-shot lubrication is fitted on the six-cylinder 20/60 h.p. Vauxhalls. These are dignified-looking cars with a fine road performance. The prices range from £495, the fabric saloon shown in Fig. 4 being £565.

On the Wolseley the radiator shutters (hand controlled) are chromium plated. The very smart black 16 h.p. six-cylinder Wolseley is good value at £450. The 21/60 h.p. eight-cylinder saloon is £515. Standard are exhibiting a new car, styled the "Envoy." This version of the 15 h.p. Standard is more roomy and has a slightly larger engine. The saloon is £340, with sliding roof.

Most of the old-established makers are avoiding extravagant body designs and garish colours. A typical example of the dignified motor-car, such as the doctor requires, is the 14/45 h.p. Talbot. The prices

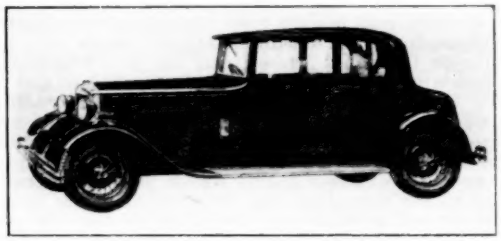
FIG. 5.



Hillman "Straight Eight" Saloon.

range from £395; an attractive sliding roof coupé is £425. The Sunbeam stand provides another lesson in up-to-date but restrained coachwork. The same applies to the eight-cylinder Hillman (Fig. 5), which also includes Silentbloc and automatic radiator shutters in its specification. This is the least expensive British "eight." As compared with a six-cylinder car, an "eight" gives even smoother running, but the difference is not so marked as between a six- and a four-cylinder engine. The saloon is £445 and there is a drop-head coupé at £510. The four-cylinder Hillman cars have no radiator shutters. Automatic shutters are provided on the new Humber "Snipe" six-cylinder model, and on the new six-cylinder Morris Oxford, the fabric saloon of which is £285. A coupé (not shown at Olympia) is £295. On the adjoining stand at Olympia is the Essex. With an

FIG. 6.



The new Singer Six 2/3 Seater.

18·2 h.p. six-cylinder engine this car is fine value for money. Radiator shutters (hand controlled) are fitted. Chassis lubrication (as with the Morris) is by grease gun. Saloon prices range from £250. The convertible coupé (£295) has a big rear compartment which locks.

The Chryslers also have plenty of locker room and are improved in performance and more dignified in appearance. The "66" saloon is £395, and the open two-seater "70" model is £450. On these cars the radiator shutters are imitation, but on the "77" automatic shutters are provided. The "77" (this figure refers to maximum speed) is £625 for the saloon.

The "Babies."

Some doctors favour a "baby" car for short journeys as a second car. The 7 h.p. Austin and the 8 h.p. Morris Minor have established a fine reputation, and now have safety glass and chromium plating. A handsome new coachbuilt saloon Minor with opening head is displayed at £149, and there is an addition to the 8 h.p. M.G. Midget range: a sportsman's coupé with four glass panels set in the sliding roof. This car is well finished at £245, but it is surprising to find the battery box lid uncovered on the floor. The finest show of "baby" car coachwork is on the 7 h.p. Triumph stand, the new saloon landaulet (£197 10*s.*) being very smart in a black finish, with a folding head, and a trunk at the rear which locks.

Conclusion.

There are some most interesting new cars at Olympia, which are fully described in the current number of the *Autocar*, but the doctor who wants a car for immediate daily and reliable service will be wise to buy a type which has been well tried out. In some cases, doubtless, the designs have been so perfected that they will give little or no trouble, but it frequently happens that, no matter how many thousands of miles a new car has been tested by the makers, some fault is discovered during the first year when thousands of people drive it for thousands of miles.

The equipment of practically every closed car now includes door locks. In some towns, however, the police require car doors to be left unlocked when the car is parked, and in such circumstances the doctor motorist will need a dickey, or some other locking compartment. For this reason the two-seater or coupé type of body has a special appeal to the doctor. The sportsman's coupé type is very popular, but on some of them the doors are too wide for convenient access in a busy street or in the garage.

Chromium plating for the bright parts is now standardised by almost all manufacturers. This also means less trouble in keeping a car in good condition, since chromium plating is non-tarnishable and requires only an occasional rub with a rag.

The doctor who has, or buys, a car not equipped with radiator shutters can, of course, obtain these as an extra fitment. A number of the accessory makers whose exhibits are displayed in the galleries at Olympia are showing shutters and muffs, and in this part of the exhibition there are to be seen a great number of other accessories, some, such as fog lights, of special interest to those motorists whose business or profession takes them out in all weathers.

THE MEDICAL INSURANCE AGENCY.—On Tuesday, Oct. 15th, the annual general meeting of the agency was held at the house of the British Medical Association, and the report covering the twenty-second year of its work was received. This showed that great expansion had occurred. The approved balance-sheet showed that the life assurance now dealt with through the agency approximates very closely to a total of one and three-quarter million pounds, and increases were shown in the sections of sickness and accident, motor-car insurance, and comprehensive household policies. The total premiums for insurance business debited to the agency by the various companies with which its business is transacted amounted to £89,948. The rebates to the doctors insuring through the medium of the agency amounted to £4187.

The following grants were made to medical charities for the year 1929:—

	£	s.	d.
Royal Medical Benevolent Fund	630	0	0
Royal Medical Benevolent Fund Guild ..	630	0	0
Epsom College: Dawson Williams Presentation Scholarship Votes	860	0	0
Girls' Education Subcommittee	250	0	0
Royal Home for Incurables, Putney	52	10	0
Sir Charles Hastings Fund	52	10	0
Total	£2,475	0	0

As a result of this distribution the total sum devoted to medical charities by the Medical Insurance Agency since 1910 amounts to nearly £23,000.

Sir Robert Bolam, Lady Barrett, Dr. J. D'Ewart, Lieut.-Colonel R. H. Elliot, and Dr. J. W. Bone were re-elected as directors.

Correspondence.

"Audi alteram partem."

ELECTROCARDIOGRAPH LEADS.

To the Editor of THE LANCET.

SIR,—A false idea about the significance of electrocardiograph leads is widely diffused among students, possibly also among their teachers, and is periodically given further leases of life in successive editions of at least one reputable text-book of medicine.

The heresy is that lead I. chiefly indicates the activity of the auricles, lead II. that of the right auricle and ventricle, and lead III. that of the left auricle and ventricle. That this is untrue can be readily proved, with regard to the auricles, in lead I. by taking any unselected series of tracings, when it will be manifest that it is lead II. which best shows up the P or auricular waves. The inaccuracy of the statement with regard to the other two leads is similarly evident. The truth is that, as Sir Thomas Lewis states (The Mechanism and Graphic Representation of the Heart Beat, third edition, p. 55):—

> "A lead from the right arm to left leg in human electrocardiography is not equivalent to a lead from electrodes placed in experiment on the actual base and apex of the heart. In human work the contacts with the heart are in reality large, they are constituted by the tissue surrounding the heart on all sides. . . . The resultant curves are composite and represent, more in their due proportions, the activity of the heart muscle as a whole."

I trust that this protest may induce editors, and those responsible for the subject in text-books, to search their pages and their consciences with a view to repentance.—I am, Sir, yours faithfully,

London, W., Oct. 22nd, 1929. GEOFFREY BOURNE.

THE DIAGNOSIS OF LARYNGEAL CANCER.

To the Editor of THE LANCET.

SIR,—At a recent meeting of the Section of Laryngology of the Royal Society of Medicine Dr. Jobson Horne read a most instructive and inspiring paper describing cases, culled from the Proceedings, in illustration of difficulties in the diagnosis of cancer of the vocal cords with resulting fallacies in statistics. A common error was the mistaking of tuberculosis for cancer, and if the diagnosis had to be made on laryngoscopical appearances alone it was often excusable. I urged the practice of submitting a fragment removed to microscopical examination before deciding to perform laryngo-fissure or a fortiori laryngectomy—life-saving resorts in cancer and life-endangering in tubercle.

In illustration I exhibited a few lantern slides of such sections from cases in which the previous diagnosis had been incorrect, or in which immediate confirmation of a disputed diagnosis was essential. In one, for instance, the case was supposed to be one of tuberculosis, but the microscope revealed unmistakable epithelioma. This was found on laryngo-fissure to be so extensive that laryngectomy had to be at once performed, and the patient after five years is now well and hearty. In another, a gentleman of mature years, and of a rather obstinate disposition, refused to accept the diagnosis of cancer until the microscope enabled us to insist on its correctness, when early removal by pharyngotomy resulted in complete and lasting cure. It is not too much to claim that several of these patients would soon have reached the incurable stage, and have lost their lives, if appropriate treatment had not been promptly carried out with the thoroughness that only an exact diagnosis could inspire and justify. The competence of the pathologists, on whose reports the diagnosis in each case was finally established, is beyond question. My friend, Mr. Layton, somehow considered that these slides "afforded a strong argument against biopsies" (see Proceedings of the Section, p. 72). I am sure that my respect for his technical opinion is shared by many of your readers, but I hope they will not allow themselves to be deterred from resorting to this invaluable method for the clinching of the diagnosis, and avoiding the difficulties described by Dr. Jobson Horne.

I am, Sir, yours faithfully,

London, Oct. 21st, 1929. JAMES DUNDAS-GRANT.

SPINOCAIN: THE CONTROLLABLE ANÆSTHETIC.

To the Editor of THE LANCET.

SIR,—You published last week an abstract of the papers read by Dr. G. P. Pitkin and Dr. F. A. Kelly to the Section of Anæsthetics at the recent annual meeting of the British Medical Association, describing their new solution "spinocain" and the technique which they employ. These papers seem to have met so far with very little comment. Those, however, who are interested in the subject of spinal anæsthesia cannot but be struck by the surprising amount of stress they lay on the question of the fall of blood pressure, due to the ordinary methods of spinal anæsthesia, which is a point they advance as one of the chief arguments in favour of this new solution. Dr. Pitkin's quotation from a "well-known American author," that "the radial pulse cannot be felt by the fingers, nor can it be detected by the ear when the arm is subjected to the pressure of the cuff of the sphygmomanometer" is hardly the experience of English observers, so that possibly his insistence on the technique which he has elaborated is as much responsible for the improved results obtained in America as his new solution.

During a term as temporary assistant R.M.O. at St. Luke's Hospital, Chelsea, last year, I took blood-pressure readings at five-minute intervals in a series of 25 cases considered suitable for this type of anæsthesia, stovaine being used; only in four of these cases was there any appreciable fall in blood pressure. In two of these latter cases the fall was directly attributable to surgical interference—i.e., clamping the meso-appendix in one case and pulling on an adhesion of the omentum to an old hernial sac in the other.

Stovaine and mocain have their disadvantages and without doubt Dr. Pitkin's method is fairly safe and superior to many others; but his No. 1 spinocain solution contains 1 per cent. of strychnine and his No. 2 solution 3 per cent. of ephedrine. Many authorities maintain that the use of ephedrine temporarily inhibits the action of adrenalin. If a patient should suffer vaso-motor collapse during a spinal anæsthetic, disaster might follow if a preoperative vaso-motor stimulant had been used, which in any way tended to inhibit the use of adrenalin—the only drug that can be used intravenously with the assurance that a rise in blood pressure will almost immediately follow. Moreover, the method at present most widely used in this country that does not require a measured degree of Trendelenburg position and permits of the drug being injected low down in the dural sac has at least the merit of simplicity, and appears to be equally safe.

In any case, far more than in other methods of anæsthesia, success depends much more upon the anæsthetist than upon the particular solution used, and failures are generally due to faults of technique. Correctly administered, within the limits of the indication for its application, spinal anæsthesia is the most satisfactory of anæsthetics, and it is to be hoped that the place given to the discussion on this subject this year will stimulate in this country the greater interest which it deserves.

I am, Sir, yours faithfully,

Norwich, Oct. 17th, 1929. L. SHILLITO.

CURES AND PREVENTION.

To the Editor of THE LANCET.

SIR,—In his letter appearing in your issue of Oct. 12th (p. 793) Dr. W. M. Crofton states that "there is only one efficient intravital *germicide* in the Pharmacopœia, and that is antidiphtheritic serum" (italics mine). It would be illuminating to workers in serology if Dr. Crofton would communicate the evidence on which he bases his theory of the germicidal action of a serum usually regarded as more or less purely antitoxic in therapeutic action. The tissues themselves appear to be an efficient germicide for the diphtheria bacillus, if its toxic products are adequately neutralised.

I am, Sir, yours faithfully,
E. W. AINLEY WALKER.

University College, Oxford, Oct. 16th, 1929.

SUBCUTANEOUS NODULES IN THE SCALP.

To the Editor of THE LANCET.

SIR,—In their paper under the above heading in your issue of Oct. 19th (p. 812) Dr. F. J. Poynton and Dr. Alan Moncrieff refer to the case of a child, which they regard as analogous to their own cases, and which was demonstrated by Dr. Hugh Thursfield, at the Royal Society of Medicine (Section of Disease in Children) on May 22nd, 1925. They say that a subsequent speaker suggested the term "leukæmic lymphadenosis." I was the speaker in question, but I suggested *aleukæmic* (not leukæmic) lymphadenosis. In the printed account the *a* comes at the end of a line, and the hyphen has been omitted, but the context makes the meaning clear. I venture to suggest that both the cases now described by Drs. Poynton and Moncrieff belong to the class of lymphatic leukæmia, of which hypoleukæmic and aleukæmic (including actually leucopenic) lymphadenoses are mere varieties, or sometimes only temporary phases. The blood-counts in the second case are inconsistent with a diagnosis of lymphadenoma (in the sense of lymphogranulomatosis maligna). The frequency of infections in subacute leukæmic cases of all kinds has been long established, and the occasional occurrence of subcutaneous or cutaneous nodules has been recognised, but much less is known of associated bone-changes—see, however, cases recorded by Haenisch and Guerner (*Zeit. f. Klin. Med.*, 1919, lxxxviii., 28), and H. K. Taylor (*Radiology*, 1926, vi., 523), which may have some bearing on the subject.

I am, Sir, yours faithfully,
F. PARKES WEBER.

London, W., Oct. 19th, 1929.

*** In describing Dr. Thursfield's case, Dr. Poynton and Dr. Moncrieff refer to "curious nodular swellings in the scalp." We regret that in our last issue the word "curious" was printed as "carious."—ED. L.

MALIGNANT TUMOURS IN THE FOWL.

To the Editor of THE LANCET.

SIR,—The contention upheld by Prof. A. Leitch that it is possible to induce malignancy in fowls by the injection of normal tissues of the fowl or of material obtained from them is of such importance, not only from the pathological but also the biological point of view, that we may be excused for reverting once more to the subject.

In our paper on the Alleged Experimental Production of Tumours in Fowls, published in THE LANCET of Oct. 5th, we emphasised the significance of the similarity of the tumours obtained by Prof. Leitch and Dr. Murphy with the Rous sarcoma No. 1. We pointed out that this similarity is an argument against their contention that they had induced malignancy by the normal tissues which they had injected, and supports our view that their results were due to an accidental contamination with the "agent" of the Rous sarcoma, which can sometimes exhibit an extraordinary virulence. To this Prof. Leitch replies in your issue of Oct. 12th that his tumour was "at first histologically distinguishable from the ordinary Rous sarcoma," and that "one at least of Dr. Murphy's tumours produced by testicular extract was quite distinct."

Our argument was based on the information supplied by Prof. Leitch and Dr. Murphy in their respective papers, published in the official report of the International Conference on Cancer, London, 1928. For the information of your readers we append the relevant quotation from these two papers. Dr. Leitch writes:—

"A year ago in a series of experiments in which normal fowl pancreas was injected into the pectoral muscles, we succeeded in obtaining a tumour of the Rous type, a tumour transmissible by filtrates and desiccates. This tumour had a more solid structure than chicken tumour I. as we know it now. Histologically, it differed in that it had areas of fairly compact spindle cells, and it contained much more mucoid material, rendering filtration difficult. In subsequent generations it has approximated more and more to the classic type until now it is quite indistinguishable from it."

Dr Murphy writes:—

"We have isolated from such normal tissues as the testicles of normal fowls, not in contact with any tumour-bearing animals, a similar agent with which we have produced the typical tumour, transplantable in over 90 per cent. of fowls."

Neither of the two authors published any figures.

We are, Sir, yours faithfuly,
A. M. BEGG.
W. CRAMER.

Imperial Cancer Research Fund, Queen-square, W.C.,
Oct. 16th 1929.

A POINT IN CERTIFICATION.

To the Editor of THE LANCET.

SIR,—In your issue of Oct. 19th under the heading of Medicine and the Law you deal with the case brought against a colleague and myself for failure to keep a proper register under the Dangerous Drugs Acts. It has been pointed out to me that to the casual observer it would appear that I might have signed a blank piece of paper, and allowed my patient to fill in whatever he or she thought fit. As this same wording has appeared elsewhere, particularly in the lay press, I should like to trespass on your space to state categorically that such was never the case. Every order, &c., signed by me whereof the body was written by someone else has been written under my personal supervision and checked over by me before signature. Although this matter is quite irrelevant to a charge of failing to keep a register, nevertheless since the matter has been raised it is only justice that this fact should be made plain, as also the fact that the magistrate specifically said: "One thing was clear; there was no suggestion against either of these medical men that the regulations were infringed for the purpose of any malpractice in administering the drugs."

I am, Sir, yours faithfully,
REGINALD KARN, *M.C.*, M.R.C.S., L.R.C.P.

Beaumont-street, Portland-place, W.,
Oct. 23rd, 1929.

The Services.

ROYAL ARMY MEDICAL CORPS.

Maj.-Gen. J. M. Sloan, late R.A.M.C., retires on retd. pay.

Col. H. E. M. Douglas, V.C., late R.A.M.C., to be Maj.-Gen.

Lt.-Col. W. L. Steele, from R.A.M.C., to be Col.

Maj.-Gen. W. R. Blackwell, late R.A.M.C., to be Dep. Dir.-Gen., Army Med. Servs., War Office.

Maj. W. J. Weston to be Lt.-Col.

ARMY DENTAL CORPS.

G. A. Ballantyne, D.F.C., late Capt., the A.D. Corps, to be Capt.

ARMY RESERVE OF OFFICERS.

Lt.-Col. J. G. Churton and Capt. D. J. F. O'Donoghue, having attained the age limit of liability to recall, cease to belong to the Reserve of Officers.

The King has approved of Lt.-Col. E. C. Hodgson, D.S.O., I.M.S., and Lt.-Col. R. B. Ainsworth, D.S.O., O.B.E., R.A.M.C., being appointed Hon. Physicians to the King, and to being promoted to the brevet rank of Colonel.

JORDANBURN PSYCHOLOGICAL INSTITUTE.

(FROM OUR EDINBURGH CORRESPONDENT.)

OPENING OF THE NEW LECTURE THEATRE.

ON Oct. 14th Mr. William Adamson, Secretary of State for Scotland, opened the new lecture theatre of the Jordanburn Nerve Hospital and Psychological Institute at Morningside. This is claimed to be the most complete theatre for medical purposes to be found anywhere. In other respects, too, the occasion was exceptional. It brought together the University, which was represented by the new Principal, Sir Thomas Holland, who here made his first public speech in Edinburgh, the City and the Royal College of Physicians. The three Maces emphasised the official nature of the meeting. Mr. Adamson noted the rapid rise of the nerve hospital and its continuous development as a vital centre for teaching and research. It was, he said, the beginning of a movement to make hospital provision for conserving the mental health of the Scottish people and raising it to a higher level. The old fears which had enslaved the public mind in facing the problems of mental disorder must be robbed of their power; the theatre in which they were met was designed as a deliberate challenge to the exclusiveness of former methods of dealing with disorder of the nervous system. The work of the institution would reach deep down into the life of the nation; the individual sufferers, the difficult and backward children, handicapped for life in many cases, and those who were mentally and morally weak and doomed to become derelict would be helped. There was hardly one branch of the social service in which the coöperation of the medical profession could be safely dispensed with. He understood that some £20,000 was still required to provide the laboratories that were the vital centre from which the whole of the research activities must radiate.

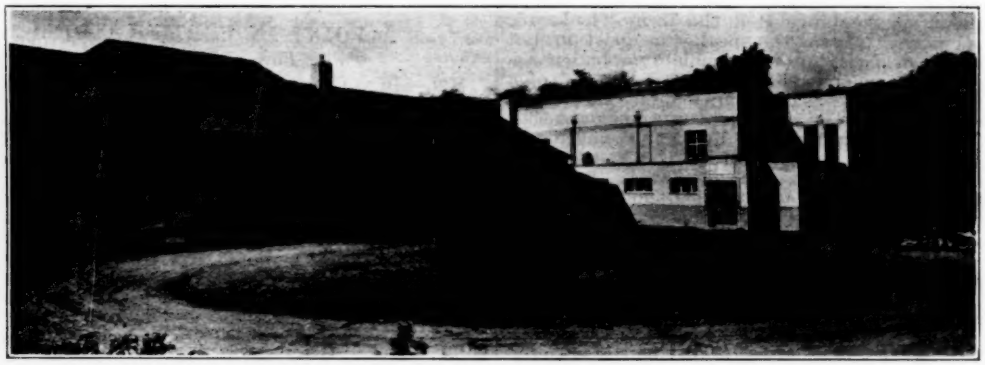
Sir Thomas Holland expressed his pleasure that his first public ceremony in Edinburgh should be the dedication of a lecture theatre to a work which would supplement the activities of the University. It was very significant that they had got over the old difficulty of regarding physical disabilities as due to providential intervention. Those who had followed the history of the medical profession would realise what a revolution had occurred since Pasteur discovered that diseases were due to a germ and infection; yet they still went on imagining that mental aberrations were something beyond the reach of research. The Institute would increase the facilities for lectures to students, but it would go much further in undertaking research into the causes of mental disturbances. Here was another opportunity for Edinburgh, largely due to the irresistible enthusiasm of Prof. G. M. Robertson, to lead the medical schools of the world in opening up new ground.

Prof. Lorrain Smith, Dean of the Faculty of Medicine, said that since the days of Laycock the study of mental disorders had been prominent in Edinburgh. He doubted if ever before in this country there had been opened on the same day a hospital which was also an institute for research. Every hospital was moving in that direction, but Jordanburn had done it first. They were introducing there an application of psychology which had never been reached in this country before. This was the day of psychology; so extensive indeed was its application that they could live from a happy childhood to a green old age in the light of pure reason.

Dr. R. A. Fleming, President of the Royal College of Physicians, who agreed that the hospital was unique in Great Britain, suggested to Mr. Adamson that they had in Borstal institutions problems which would be greatly helped by psychological investigation.

Construction of the Theatre.

The lecture theatre has been designed to make it suitable for academic purposes and for semi-popular lectures of an educational character. It is seated for over 250 persons, each of whom will have a perfect view of the platform, which is 34×12 feet. Echo has been avoided by covering walls and ceiling with a porous material known as celotex. The backs of the seats have been padded with corduroy, so that if the audience is small there is no echo from wooden benches. The passages are covered with matting. There is thus no hard or smooth surface from which the sound of the voice can recoil, with the exception of the wall at the back of the lecturer, which acts as a sounding board; but its echo follows the voice so quickly that it accentuates the sound of the words without distorting them. The theatre has a cinema, an epidiascope, and a separate complete out-patient department to which admission is obtained from the outer hall. The stage is in a line with the broad corridor of the hospital so that patients in bed can easily be brought along; there is a large anteroom from which admission to the platform is gained, and patients may be held there in reserve.



Jordanburn Psychological Institute. On the right is the new Lecture Theatre, on the left the out-patient department of the Nerve Hospital.

Staff and Curriculum of the Hospital.

A feature of the hospital is a department for psychology under the directorship of Mr. J. Drever, D.Phil., reader in psychology at the University, and his two assistants, Miss Mary Collins, Ph.D., and Dr. W. R. D. Fairbairn. Pure psychology is now a compulsory subject for the student in the medical curriculum of Edinburgh University, and is taught on alternate days with the subjects of psychiatry and psychopathology during the whole of the spring term.

A few days before the opening an anonymous donor gave a sum of £10,000 as an endowment fund for the working expenses of the lecture theatre and the out-patient department.

LONDON HOSPITAL POST-GRADUATE COURSE.

THIS year for the first time a post-graduate course was held at the London Hospital in connexion with the reunion of the annual dinner. A considerable number of old students attended lectures and demonstrations from Wednesday to Saturday of last week, and the experiment was adjudged a great success, to be repeated, if possible, on a larger scale a year hence. On p. 867 of our present issue will be found the opening paper of the course by Dr. Russell Brain; in a later issue we hope to publish Dr. S. P. Bedson's observations on vaccination, whilst reports of a few of the other addresses appear below.

In the course of some observations on the

Present Position of General Light Therapy

Sir ROBERT STANTON WOODS referred first of all to the two schools of thought which favoured the use of long light rays (luminous) and short rays (wavelength 2900 to 2500) respectively. The theoretical grounds for treatment by light were, he said, by no means well established. One fact, and one fact only, was clear—namely, that exposure of the skin to ultra-violet rays would prevent and cure rickets. But these rays had other probable—indeed, highly probable—effects. In the first place they were bactericidal. This property, however, was of little use in practice, since as bactericides they could not penetrate one bacterial spore to reach another. What was likely to be more important was that it had been pretty definitely shown that exposure of the skin to ultra-violet rays would increase the bactericidal power of the blood. Probably the process here was local and comparable to protein shock—that is to say, it might produce a non-specific immunity reaction. The difference of opinion between exponents of long ray therapy and short ray therapy was conspicuous in the treatment of tubercle, a disease in which light was almost certainly useful, at any rate in the surgical forms. There was reason to suppose that ultra-violet therapy was beneficial also in certain circumstances in frank septicæmia. It would do no good here if the resistance of the body against infection was exhausted, but it might help a patient in whom there still existed the possibility of antibody stimulation. The use of light in other general conditions, and especially in debility, was on even less certain ground; no incontrovertible evidence had been brought forward to show that exposure of the so-called debilitated person to ultra-violet rays had any tonic effect. His own experience had been confined to its employment for definite diseases, and especially inflammatory conditions of joints. He had no doubt that radiation did have some profound good effect in certain forms of subacute and chronic arthritis. In one case, indeed, complete cure had followed such treatment applied after other measures had failed over a period of two years, and though complete success of this kind was exceptional, he had noticed that the general health usually improved under light treatment, and that in the majority the pain and stiffness were greatly alleviated, although he had not yet been able to show that (with the exception mentioned) the pathological joint changes were affected. As for the other effects attributed to ultra-violet rays, there was very little evidence of their utility in medicine. Nor had any means yet been devised for measuring dosage scientifically. Of the two principal methods in use one depended on the measurement of erythema after exposure to the rays, whilst the other was frankly empirical. In treatment some authorities, such as Rollier, began by exposing a small area of skin to light and increased this area gradually; others preferred short exposures of the whole body from the first. The dosage technique depended mainly on the nature of the source employed. It would be seen, said the speaker in conclusion, that the experimental evidence in favour of light treatment was meagre, and that conclusive clinical evidence, which would be much more useful, had yet to be collected.

Mr. ALAN PERRY gave a lecture demonstration on the

Injection Treatment of Varicose Veins.

Three solutions had, he said, been tried at the London Hospital—namely, 20 per cent. sodium chloride (which had not proved very satisfactory), 30 and 40 per cent. sodium salicylate, and quinine and urethane (1·0 g. quinine plus 2·0 g. urethane in 15 c.cm. sterile water). Special syringes had been used, but any 5 c.cm. syringe would do perfectly well. The ordinary hypodermic needle was too sharply pointed for this work, but could be ground down to a small bevel. Injections might be given with the patient standing up, sitting, or lying down. Preliminary bandaging of the leg was unnecessary. It had been shown that the flow of blood in varicose veins was downwards, and even if the solution injected was not actually carried distally, its flow towards the heart was at any rate very slow. The solution acted by causing swelling and disappearance of the endothelium of the vein. The blood did not simply coagulate, as in thrombophlebitis. A special name had been coined for the inflammatory condition produced—namely, venitis. The consequences of injection were: (1) thickening of the walls of the veins; (2) obliterative sclerosis; (3) obliterative sclerosis and perivenitis. When salicylates were used intense cramp might be felt in the leg after injection, lasting perhaps 30 seconds; with quinine and urethane, on the other hand, the treatment was painless at the time. In either case injection was followed in two or three days by thickening along the vein, perhaps with discoloration, and rarely more acute inflammation developed. As a rule, patients noticed improvement after the first injection. Embolism had never occurred in the London Hospital cases, and there was no record in the literature of embolism after injection of salicylates. Sloughing of the skin was an occasional complication but became more infrequent as the operator became more skilled. It was probably due to leakage of solution outside the vein, and although troublesome was not dangerous. The slough took a long time to separate and healing was slow. Fomentations should be used to remove the slough; then a bland ointment could be applied. Patients occasionally fainted, and with quinine they sometimes complained of buzzing in the ears and a taste of quinine in the mouth. In every case a full medical examination should precede treatment, and albuminuria or glycosuria should deter the surgeon from undertaking it. It should be remembered that all pains in the foot and leg were not necessarily due to varicose veins. The treatment was suitable for any tortuous varicose vein up to the saphenous opening, provided that the general medical condition was sound and that there was no generalised œdema of the leg with lymphatic obstruction. Pregnancy was a further contra-indication. Injection should not be attempted for minute superficial varices or when the condition was secondary to deep thrombosis, as in phlegmasia alba dolens. Recent thrombophlebitis also contra-indicated injection treatment.

Modern Treatment of Lead Poisoning.

Dr. DONALD HUNTER said he knew his audience would agree that so far as industrial plumbism was concerned the treatment was first and foremost preventive. Those who were certifying surgeons under the Factory Acts would appreciate, too, that the Home Office regulations as applied in this country controlled the situation better than any other scheme elsewhere in force. But new sources of poisoning were constantly arising, the most productive at present being the manufacture of electric accumulators. Clinical observation and the evidence of experimental pathology provided abundant evidence that inhalation of dusts and fumes was far more dangerous than ingestion. Extensive chemical

analyses after prolonged exposure had shown that lead was stored in the skeleton, probably in the form of tertiary phosphate. Of the total amount in the body 90 per cent. might be immobilised in the bones and while it stayed there it was harmless. A study of the factors causing its elimination and storage had been made the basis of modern therapy. The metabolism of calcium and of lead were very similar so that a low calcium diet favoured the excretion of calcium and of lead, whereas a high calcium diet and calcium therapy favoured their retention in the bones. Therapeutic measures which greatly disturbed the acid-base balance of the blood promoted elimination of lead, probably by mobilising it as secondary phosphate, which was a hundred times more soluble than the tertiary salt. Among agents used for this purpose were phosphoric and hydrochloric acids and their ammonium salts, and sodium bicarbonate; the mode of action of potassium iodide was unknown. The practical conclusions to be drawn from these observations were:—

1. The patient poisoned in industry has shown himself to be susceptible. He must never work in lead again.

2. In the treatment of toxic episodes (colic, palsy, encephalopathy) the patient should have a high calcium diet (milk, eggs, butter, custards, ice-cream, green vegetables, nuts, raisins) plus calcium lactate 3·0 g. daily. Constipation should be combated by enemata and by magnesium sulphate. Colic might be treated with local heat, amyl nitrite, nitroglycerine, and atropine. In bad cases 20·0 c.cm. of a 5 per cent. solution of calcium chloride should be injected *very slowly* into a vein. In palsy (while developing) the general treatment should be as above, together with splints and massage. In encephalopathy, besides treating convulsions and mania symptomatically, calcium therapy was required and intravenous calcium chloride might be necessary.

3. *Elimination* should be attempted only in the absence of toxic episodes. A constant watch must be kept for their occurrence, and if they did occur it was necessary to revert to a high calcium diet and calcium therapy. In all cases a high calcium diet must be resumed after three weeks' treatment. For a low calcium diet the patient might have meat, liver, potato, rice, tomato, banana, apple, butter fat, bread without milk, tea and coffee without milk, sugar, salt, pepper. Dilute phosphoric acid, 20·0 c.cm. (in half a pint of water flavoured with sugar and gin), should be taken through a straw hourly for eight doses a day if tolerated; also ammonium chloride, 1·0 g., in half a pint of water, hourly (eight times daily), if tolerated. The symptoms of acid intolerance were loss of appetite, headache, and nausea; but most patients never developed these. Elimination might be continued for three weeks. It was very much more effective than treatment by potassium iodide. When the patient had nephritis elimination was assisted by sodium bicarbonate, 40·0 g. a day; acids must never be used.

Causes of Sudden Death.

Dr. W. W. WOODS spoke of sudden death in the light of his experience as assistant director of the Institute of Pathology. He subdivided the causes according to the organ affected:—

1. *Heart.*—(*a*) Coronary atheroma and thrombosis. This constitutes the largest of all groups. There is infarction of the myocardium, the anterior descending coronary artery being that most commonly affected. (*b*) Coronary atheroma with stenosis of coronary trunk but no thrombosis. (*c*) Syphilitic aortitis with stenosis of the coronary orifices, the coronary trunks being normal. (*d*) Hæmopericardium either from rupture of the infarcted heart or from rupture of aneurysm of the ascending aorta into the pericardium. (*e*) Aortic incompetence, due to old rheumatic involvement or due to syphilitic aortitis. (*f*) Atheromatous stenosis of the aortic valve.

2. *Cardiovascular.*—(*a*) Cardiovascular hypertrophy either primary or secondary to chronic interstitial nephritis. (*b*) Rupture of aortic aneurysm into œsophagus. (*c*) Spontaneous rupture of the aorta usually presenting a ragged tear about an inch long. (*d*) Perforation of aorta by sharp foreign body impacted in œsophagus.

3. *Lung and Air Passages.*—(*a*) Chronic pulmonary tuberculosis with hæmoptysis and suffocation. (*b*) Foreign body in air passages (pharynx, larynx, trachea, bronchi). (*c*) Pulmonary embolism, large enough to be fatal, occurs only in people just out of bed after an illness. Death occupies several minutes.

4. *Brain.*—(*a*) In cerebral hæmorrhage sudden death only occurs in a very extensive lesion. The patient usually survives several hours. (*b*) Rupture of congenital aneurysm of the circle of Willis. (*c*) Hæmorrhage into a soft glioma. (*d*) Cerebral embolism rarely causes sudden death.

5. *Stomach.*—Perforated gastric ulcer is an occasional cause.

6. *In Infants*, the post-mortem diagnosis presents great difficulty. The condition may be due to: (*a*) Inhalation of vomit—usually white curdy stomach content. (*b*) Overlaying—the exact circumstances leading to the fatality are very important. The lips and nails are blue and petechial hæmorrhages are found in pleura, pericardium, thymus, and testis. (*c*) Convulsions. (*d*) Hæmorrhage into the suprarenals—rare. (*e*) Bilateral thrombosis of renal veins causing hæmorrhagic infarction of the kidneys.

MR. ROBERT MILNE delivered a lecture on

Pain in the Fore Part of the Foot.

In the causation of such pain he distinguished six main factors: (1) Tight socks and shoes. (2) Tinea or cheiropompholyx affecting the toes. (3) General diseases, such as tuberculosis, syphilis, and gout, affecting the bones and joints of the foot. In these three groups the treatment must obviously be directed to the underlying cause. (4) In a fourth group he placed cases of hallux rigidus and hallux valgus with or without bunion, flat-foot, and hammer-toe. The relative importance of the various factors in the production of the pain must be carefully weighed. In treatment attention to shoes and socks must come first, and might be all that was necessary. If operative measures were deemed advisable they should be as conservative as possible. (5) In another group he placed those cases with a tendency to claw-foot, with or without shortening of the tendo Achillis. Such a tendency would invariably throw too much weight on the fore part of the foot, with consequent pain, chiefly in the region of the head of the first metatarsal. If on examination it was found that the metatarso-phalangeal joint of the great toe could still be straightened, transplantation of the tendon of extensor hallucis longus was justifiable. If the condition was more advanced tenotomy of the tendo Achillis would also be necessary. In many cases nothing further was required than the fitting of a transverse bar of leather to the sole of the boot at a level just posterior to the heads of the metatarsals. (6) Incompetence of the first metatarsal owing to its being either too short or atavistic—i.e., possessing abnormal mobility at its tarsal joint—threw excessive strain on the second metatarsal, and might produce considerable pain in the fore part of the foot. Evidence of this condition might be found in actual osseous hypertrophy of the second metatarsal, callosity of the skin beneath its head, a point of tenderness at its base, and relative thinness of the skin beneath the head of the first metatarsal. In young people actual infraction of the head of the second metatarsal might be demonstrable by X rays. Also apparently spontaneous fractures of the shafts of the second or third metatarsals were not uncommonly found, especially in young adults subjected to excessive or sudden strain on the feet—e.g., route marching. Without radiographic examination such fractures were easily missed. The metatarsal bar was again a great help in treating this group, but in cases where fracture was present rest for the foot for three to four weeks

was essential if chronic pain was to be avoided. (7) Mr. Milne mentioned Köhler's disease (a condition allied to Schlatter's and Osgood's diseases) as another cause of pain in fore part of the foot requiring rest. (8) He pointed out that fracture of the fifth metatarsal occurred almost invariably at its base and must be distinguished in X rays from a small accessory bone (bone of Vesalius) which was occasionally present in this region.

Dyspepsias of Childhood.

Dr. ROBERT HUTCHISON began an address on this subject by comparing the dyspepsias of childhood and adult life, referring especially to the relative rarity of organic forms, and the greater importance of the intestine, in childhood. In the child dyspepsia might simulate other things; in the adult other things might simulate dyspepsia. The dyspepsias of childhood could be classified as gastric (acute and chronic), hepatic, and intestinal. In acute *gastritis* the child not infrequently had symptoms of considerable severity—high temperature, repeated vomiting, convulsions, and even coma. These must be distinguished from the symptoms of "acute abdomen" and acute infective diseases, including meningitis. The treatment could be summarised as bed, starvation, and sodium bicarbonate. Chronic gastric dyspepsia of the catarrhal form might follow acute gastritis, or might be due to some source of chronic irritation such as the too free use of roughage in the diet. Chill (from inadequate clothing, &c.) was also an ætiological factor. The child had a diminished appetite, nausea (rarely vomiting), and occasionally attacks of pain in the mornings; it was often constipated and had a coated tongue. Treatment consisted in removing the irritating forms of food from the diet; in seeing that the child had ample time for its meals and masticated efficiently, and in ensuring that the clothing was warm. Rhubarb and soda were the most useful drugs. The functional form of chronic gastric dyspepsia was uncommon in childhood. An atonic variety might be encountered at puberty. *Hepatic dyspepsia* was often seen in children under school age. They were "unsatisfactory" children with capricious appetites, bad tempers, and bad breath; they were pallid and slept badly. Their stools were usually pale and often constipated. They suffered from bouts of vomiting and acidosis, fever, and migraine which might be called "the hepatic episodes." The factors in the production of this form of dyspepsia were an inborn hepatic inadequacy (often hereditary) and over-use of the liver foods such as milk, cream, eggs, chocolate, and oranges. The quantity of these in the diet should be cut down (especially milk). The most useful drugs were rhubarb and mercury, and paraffin was best avoided. *Intestinal dyspepsia*—the so-called mucous disease—was found usually in children of school age (6–12 years). These also were "unsatisfactory" children; they were languid, and dark under the eyes; they had disturbed nights with terrors or sleep-walking; they had attacks of pallor or fainting, and of night sweating. They had poor appetites with occasional voracious hunger, they passed jelly in the stools, and they were not often constipated. They also suffered from "episodes," which include bouts of lienteric diarrhœa, umbilical colic (in which the pain might be severe, but was always short-lived, and might recur several times a day). They were subject to fainting and worms. These cases must be distinguished from chronic appendicitis and abdominal tuberculosis. The important factor in their production was the over-use of carbohydrate in the diet, which induced an excessive secretion of mucus in both stomach and intestine. The supply of carbohydrate should therefore be cut down. Useful drugs were alkalis, rhubarb, nux vomica, bitters, and such laxatives as aloes and senna. Paraffin again was best avoided; iron was unnecessary and cod-liver oil and malt should not be employed at the outset of treatment. For diarrhœa and colic a few drops of tincture of opium (with or without belladonna) could be given before meals and a laxative at night. In the treatment of worms in these cases it was essential to recognise the underlying dietetic error. In all these forms of dyspepsia general regulation of life and change of surroundings (people and place) were of great importance.

Mr. A. J. WALTON gave a short lecture on the *Place of Surgery in Lesions of the Upper Abdomen.*

Dealing first with lesions of the stomach and duodenum, he distinguished four pathological groups: (1) The first was congestion of the mucosa, sometimes with small superficial erosions. This condition was seen, for example, in connexion with purpura, with heart failure and back pressure, and with burns or general sepsis, in all of which conditions the history might be one of acute onset with severe gastric symptoms. These cases obviously did not require surgical treatment. (2) The small multiple erosions of the stomach found in the dyspepsias of young women should also be treated medically; except in cases with severe or repeated hæmatemesis, when a rapid gastro-jejunostomy might be needed to save life. (3) In a separate group he placed gastric and duodenal ulcers of moderate size, giving a short but typically periodic history of dyspepsia, usually with a raised gastric acidity and some radiographic evidence of abnormality. Medical treatment was being widely advocated in such cases, but Mr. Walton said that he himself was not yet convinced of its success and that he still advocated surgical measures. (4) Large chronic penetrating ulcers giving a long history should, in his opinion, always be treated surgically, especially in view of the gravity of the complications—i.e., severe and occasionally fatal hæmorrhage, perforation, stenosis, and carcinoma—all of which might occur despite careful medical treatment. The danger that gastro-jejunal ulcer and lesser curve ulcer might follow gastro-jejunostomy for duodenal ulcer was often mentioned in argument against surgical treatment, but both these sequelæ were usually associated with a failure to reduce gastric acidity and this could almost certainly be avoided by correct and careful technique. It was extremely rare for carcinoma to develop in cases treated by gastro-jejunostomy. Quoting from his own figures, Mr. Walton said that from 80–92 per cent. of cases of gastric and duodenal ulcer treated surgically were free from symptoms five years after operation, and maintained that at present no figures of the results of medical treatment could compare with these. Going on to speak of disease of the gall-bladder, he advocated surgical treatment in certain cases of gall-bladder dyspepsia even when the pressure of stones could not be proved. He showed several gall-bladders removed from such cases in which extensive deposits of lipoid and, in some, small concretions, were present in the walls; which conditions, he contended, were very unlikely to be touched by medical treatment. In undoubted cases of cholelithiasis surgical treatment must be advised, and cases of acute cholecystitis should be operated upon as soon as diagnosed.

FEDERATION OF THE HEALTH RESORTS OF FRANCE.—A medical tour has been arranged by the Société Médicale du Littoral Méditerranéen to take place from Dec. 26th to Jan. 8th. It will include a visit to Marseilles, Toulon, Hyères, St. Raphael, Cannes, Le Cannet, Grasse, Juan-les-Pins, Nice, Menton, Monaco, Monte Carlo, Beaulieu, San Remo, Bordighera. Full particulars can be obtained from Madame Juppé-Blaise, Federation of the Health Resorts of France, 1, Gordon-square, W.C. 1.

ALMONERS UNDER THE LOCAL GOVERNMENT ACT.—A meeting of the Hospital Almoners' Institute has been held at the Leeds General Infirmary at which the position of almoners under the Local Government Act, 1929, was discussed. It was pointed out that the local authorities who take over poor-law hospitals will greatly need the help of trained almoners for follow-up work, since beds can only be emptied reasonably quickly by ensuring that the patients upon leaving go home to suitable conditions.

Medical News.

UNIVERSITY OF OXFORD.—On Oct. 17th the degree of Bachelor of Medicine was conferred on B. R. Caygill.

UNIVERSITY OF CAMBRIDGE.—At a congregation on Oct. 18th the following degrees were conferred:—

M.D.—W. W. McLean, N. F. C. Burgess, and F. B. Parsons.
M.B. & B.Chir.—*A. D. Charters, J. C. Gordon, and Heward Bell.
M.B.—Lancelot Shillito.
B.Chir.—N. L. White.

*By proxy.

ROYAL COLLEGE OF PHYSICIANS OF LONDON.—The annual Harveian Oration was delivered on Friday afternoon, Oct. 18th, by Sir Wilmot Herringham. After the delivery of the Oration the Baly medal for distinction in the science of physiology was awarded to Dr. E. D. Adrian, and the Bisset-Hawkins medal to Dr. Edward Mellanby, for his work on the physiology of nutrition. In the evening a dinner was given by the President of the College, Sir John Rose Bradford, at which were present, among the guests, Mr. Arthur Greenwood (Minister of Health), Lord Moynihan (President of the Royal College of Surgeons of England), Colonel Samman, R.A.M.C. (Master of the Society of Apothecaries), Mr. Justice Eve, Lord Gorell (chairman of the Society of Authors), Lord Riddell, Sir Reginald Blomfield, R.A., Sir Percy Mackinnon, the Harveian Orator, and the recent medallists of the College.

BRITISH INSTITUTE OF PHILOSOPHICAL STUDIES.—Mr. E. S. Russell, D.Sc., will give six lectures on the Interpretation of Development and Heredity on Mondays at 5.45 P.M. at University College, Gower-street, W.C., from Nov. 4th. Full information may be had from the Director of Studies, 88, Kingsway, London, W.C. 2.

ROYAL COLLEGE OF PHYSICIANS OF EDINBURGH, ROYAL COLLEGE OF SURGEONS OF EDINBURGH, AND FACULTY OF PHYSICIANS AND SURGEONS OF GLASGOW.—The following candidates for the triple qualification have been approved and have been admitted as licentiates:—

H. P. Lawson, E. C. Thomas, H. C. Franz, C. J. Poh, John Kearney, Amin Madwar, F. K. Fenton, D. F. Johnstone, N. J. W. Smith, Duncan Gould, W. O. Molander, J. W. Gregory, Aaokranjan Khastgir, R. C. Annett, W. P. Kennedy, T. S. M. Samahin, H. G. Somerville, K. M. Sambantham, John Elliott, Saravanamuttu Thambish, G. G. Brown, A. O. Jollie, S. A. Kelaney, K. C. K. E. Raje, and A. E. Daviot.

The following have satisfied the examiners in the undermentioned subjects:—

Medicine.—R. F. L. V. Harvey, Florence L. M. Millard, and E. O. Hagedorn.
Surgery.—G. R. Parker, Pieter van der Lith.
Midwifery.—G. R. Parker, George Henderson, P. van der Lith, T. H. Oh, Florence L. M. Millard, and E. O. Hagedorn.
Medical Jurisprudence and Public Health.—M. K. Yong, C. C. Teck, A. I. Baynid, Mary M. Buchanan, Andrew Brock, W. E. MacDougall, S. V. Rajah, W. R. Young, T. W. Millar, H. C. Bodemer, Effie E. Keighley, Gavin Brown, J. W. MacGregor, and M. N. Rozdon.

ROYAL COLLEGE OF SURGEONS OF EDINBURGH.—At a meeting of the College on Oct. 16th, with Mr. Alexander Miles, the President, in the chair, the following 33 successful candidates out of 108 entered who passed the requisite examinations between July 4th and 13th were admitted Fellows:—

James William Anderson, Robert Stivala Aspinall, Glen Howard Burnell, John Henry Coolican, Robert Cormack, Newell Raine Cotton, Desmond Edward Cuffey, Ramanlal Thakordas Desni, Thomas Smith Donovan, Eric Alfred Fiddien, Alan Armour Fothergill, John Rex Godsall, Sydney Joseph Pereira Gray, Victor Charles Joseph Harris, Leo Herzenberg, Gangadar Lakshman Khirwadar, Beryl Prideaux Lye, John Thomson McQuat, Douglas George Martin, David Matthew Watson Maxwell, Gavin William Milroy, Bertram George Mitford, James Ernest Monro, George John Murray, Evan William Ronger Hubert Phillips, Gordon Francis Rich, William Buchanan Smellie, Alfred Charles Thomas, Michael Emmanuel Tiruchelvam, Clifford Harold Watson, Francis Lindsay Webster, Lucien Benedict Wevill, and Neville Andrew Jack Young.

At the annual meeting of the College on Oct. 16th the following office-bearers were elected for the ensuing year: President, Dr. James Haig Ferguson; Vice-President, Mr. Alexander Miles; secretary and treasurer, Mr. J. W. Struthers; convener of Museum Committee, Mr. C. W. Cathcart; librarian, Mr. D. M. Greig. Council: Mr. J. W. Dowden, Mr. Henry Wade, Mr. W. J. Stuart, Mr. A. H. H. Sinclair, Mr. G. L. Chiene, and Mr. J. S. Fraser. Representative on the General Medical Council: Mr. Alexander Miles.

ROYAL COLLEGE OF PHYSICIANS OF IRELAND.—The annual meeting of the College was held on St. Luke's Day. Dr. W. A. Winter, who has been President since 1927, was re-elected for a third year of office, and he nominated Dr. J. A. Matson, Senior Censor, for a second year as Vice-President. The annual dinner was held on Oct. 21st, when the Fellows entertained a large number of guests. Before the dinner, the President admitted to the Honorary Fellowship of the College Dr. D. J. Coffey, President of University College, Dublin, and President of the Irish Free State Medical Registration Council.

WEST RIDING ASSOCIATION OF EDINBURGH GRADUATES.—The annual dinner of the West Riding Association of Graduates of the University of Edinburgh will be held at the Midland Hotel, Bradford, on Wednesday, Nov. 13th, at 7.15 P.M. The guest of the evening will be Dr. A. Logan Turner. The general meeting of the society will be held before the dinner, at 6.30 P.M. Further information may be had from the hon. secretary at 33, Manor-row, Bradford.

ADDENBROOKE'S HOSPITAL, CAMBRIDGE.—An appeal is being made for £90,000 for the enlargement and improvement of this hospital, which is closely associated with the University. A prominent feature of the scheme is the provision of accommodation for paying patients. So far £23,000 has been subscribed.

EVELINA HOSPITAL FOR CHILDREN.—A convalescent home in Berkshire has been presented to this Southwark hospital on condition that an endowment fund of £20,000 is raised.

JUGOSLAVIAN MEDICAL VISITORS.—A party of over 100 doctors from Jugoslavia assembled last Saturday in the Barnes Hall of the Royal Society of Medicine, where short addresses of welcome were given by Sir William Hale-White and Sir James Berry on behalf of the Fellowship of Medicine and the Jugoslav Society of Great Britain respectively. The Jugoslavian Minister was present, and Dr. Richard Burian, professor of physiology in the University of Belgrade, replied on behalf of the visitors. The medical faculties of Jugoslavia, he said, were young and not quite settled, being founded in a country worn out by the war, and without proper traditions in medical teaching. But they were earnestly trying to raise teaching and research, theory and practice to the level they had reached in other civilised countries, and in this endeavour nothing could be more helpful than close relations with the headquarters of British medicine. They hoped that these relations would become more and more close and cordial and that they would have the pleasure of welcoming British medical men to Jugoslavia, though their medical institutions were only at the beginning of their development. A few days ago they had had the privilege of seeing at Belgrade Prof. Leonard Findlay, of Glasgow, and had listened to a most interesting lecture from him. They would be happy if other representatives of British medicine and science would follow his example. Dr. Ainsworth Davis then exhibited Dr. R. Canti's film showing the cultivation of healthy and cancerous tissues under the microscope and the action of radium emanation upon them. This film had been lent by the British Empire Cancer Campaign.

LONDON HOSPITAL DINNER.—On Oct. 17th a large body of former students did their best to bring a London Hospital atmosphere into the ballroom of the May Fair Hotel—which is a long 4*d.* bus ride from their spiritual home. The attempt owed much of its success to the skill with which Mr. Hugh Lett as chairman supplied them with facts of common interest. Uppermost in his mind were the changes confronting voluntary hospitals under the new Local Government Act—changes which, he said, were necessarily causing acute financial anxiety. Local authorities in London, with 70,000 beds at their disposal, would be strong competitors against the charitable institutions with their 30,000, and to resist this competition the voluntary hospitals must show that they were fit to survive. He had no doubt that the London could show such fitness by its research and teaching and by spreading sound medicine and surgery throughout the world. The Freedom Research Fund placed a larger sum of money at its disposal than was available for investigation at any other school in the country. While the new municipal hospitals could do admirable curative work they could not undertake medical education; they could not have the same clinical field; they would lack the fine laboratories and the wonderful pathological department; and in general they would not get the same stamp of man for their staffs. But if the London was to hold its own it ought to have better quarters for students, and a new hostel was urgently needed so that suitable men should not be put off by the lack of accommodation. In sport the record of the present students was admirable.

They had been well in the running for nearly all events, being beaten by 3 points in the Rugger final, and finishing in the semi-finals of the cricket and hockey. They had won the rifle cup, and (incidentally) the tug-of-war for the third year in succession. For old students of the hospital a post-graduate course was now in successful progress, and he welcomed this new departure because it would help to prevent London men from feeling themselves dissociated from their hospital. It was wrong that those who had spent five years there should come back as strangers, and he wished that they would more often return and introduce themselves to members of the staff on rounds in the wards or in the out-patient department, when they would be sure of a warm welcome. After referring to the work of Lord Dawson, Sir Hugh Rigby, and Sir Robert Stanton Woods during the King's illness, Mr. Lett went on to speak of senior members of the company present. These included Rampley, long in charge of the single operating theatre of the hospital, now in his eighty-sixth year, and the guide and friend of many generations of students; Sir Alfred Rice-Oxley; and Sir James Clark, son of Sir Andrew Clark. Their names recalled to Mr. Lett the days when general surgeons operated on everything; when there were no rubber gloves and sterilisation of the hands was carried so far that one surgeon used to snip off bits of his assistants' fingers and make cultures to see that they were sterile; when information about cases had to be sent up to Harley-street in a cab; when "compulsory anæsthetic" was an apt description of a process which often needed the coöperation of a member of the Rugger XV.; when the routine was that patients with fractures should be treated preventively for delirium tremens; and when the staff were met by their house surgeons in pomp and circumstance and morning coats.

Mr. George Neligan proposed the health of the chairman. "You will find him," he said, "in every walk of the life of the hospital, doing his work quietly; and if he gets what he wants then the thing is a success." Mr. Neligan believed that nowhere would be found a happier staff than that of the hospital at the present day, and so long as it contained men like Mr. Lett he failed to see how any Act of Parliament could do it down. After the chairman's health had been drunk to appropriate music, Mr. E. C. Lindsay said a few words as joint secretary of the dinner, and Dr. Russell Andrews told only one story—his meagre answer to a demand which has to be satisfied before any London Hospital dinner can be called complete.

Medical Diary.

SOCIETIES.

ROYAL SOCIETY OF MEDICINE, 1, Wimpole-street, W.
MONDAY, Oct. 28th.—8 P.M., ODONTOLOGY. Presidential Address. Mr. J. McK. Ackland: Oral Sepsis in its Relation to General Disease. Casual Communication. Mr. F. N. Doubleday: Two Cases of Hypertrophy of the Jaw.
FRIDAY, Nov. 1st.—10.30 A.M., OTOLOGY (Cases at 9.30 A.M.). Presidential Address. Mr. W. M. Mollison: Triumphs and Failures of the Mastoid Operation. Papers have been promised by Mr. G. J. Jenkins, Mr. L. Graham Brown, and Mr. J. P. Stewart. Cases will be shown by Mr. Mills, Mr. L. Graham Brown, and others. 5 P.M., LARYNGOLOGY (Cases at 4 P.M.). Cases will be shown by Mr. W. S. T. Neville, Dr. Dan McKenzie, Mr. V. E. Negus, Mr. H. A. Kisch, Mr. T. B. Layton, and others. 8.30 P.M., ANÆSTHETICS. Discussion on Avertin Anæsthesia. Openers: Dr. J. Blomfield and Sir Francis Shipway.

MEDICAL SOCIETY OF LONDON, 11, Chandos-street, Cavendish-square, W.
MONDAY, Oct. 28th.—8.30 P.M., Discussion on Radium Therapy, to be introduced by Mr. A. E. Hayward Pinch and Prof. Sydney Russ.

LECTURES, ADDRESSES, DEMONSTRATIONS, &c.

ROYAL COLLEGE OF SURGEONS OF ENGLAND, Lincoln's Inn-fields, W.C.
MONDAY, Oct. 28th.—5 P.M., Mr. C. P. Wakeley: Specimens of Calculi.
FRIDAY, Nov. 1st.—Sir Arthur Keith: Spinal Deformities in the Sacro-iliac Region.

FELLOWSHIP OF MEDICINE AND POST-GRADUATE MEDICAL ASSOCIATION, 1, Wimpole-street, W.
MONDAY, Oct. 28th, to SATURDAY, Nov. 2nd.—MEDICAL SOCIETY OF LONDON, 11, Chandos-street, Cavendish-square, W. Mon., 5 P.M., Lecture by Dr. Maurice Davidson: Coughs. No fee. Tues., 8.30 P.M., Lecture by Dr. A. F. Hurst: Recent Work on Disorders of the Stomach. Fri., 8.30 P.M., Lecture by Dr. J. W. McNee: Recent Views on Diseases of the Liver and Biliary Tract. Specially suitable for M.R.C.P. candidates.—ST. BARTHOLOMEW'S HOSPITAL, City-road, E.C. Thurs., 1.30 P.M., Demonstration of Cases in the Wards by Sir Thomas Horder. No fee.—SAMARITAN HOSPITAL FOR WOMEN, Marylebone-road, N.W. Thurs., 10 to 12.30 P.M., Gynæcological demonstration by Mr. McKim McCullagh. No fee.—METROPOLITAN HOSPITAL, Kingsland-road, E. Special post-graduate course in Medicine, Surgery, and Special Branches. Daily, 10.30 A.M. to 5.30 P.M., demonstrations, operations and lectures.—ROYAL FREE HOSPITAL, Gray's Inn-road, W.C. Fri., 5 P.M., First of four weekly demonstrations in Antenatal Treatment by Prof. Dame Louise McIlroy.—CENTRAL LONDON THROAT, NOSE AND EAR HOSPITAL, Gray's Inn-road, W.C. Third week of course of Clinical, Ear, Nose and Throat work. All day.—Further particulars from the Fellowship of Medicine.

SOUTH-WEST LONDON POST-GRADUATE ASSOCIATION, St. James's Hospital, Ouseley-road, Balham.
FRIDAY, Nov. 1st.—4 P.M., Dr. W. J. O'Donovan: Skin Diseases Common to Animals and Man.

ST. PAUL'S HOSPITAL, Endell-street, W.C.
WEDNESDAY, Oct. 30th.—4.30 P.M., Mr. Stanford Cade: The Limitations of Radium Therapy on Genito-urinary Diseases.

LONDON SCHOOL OF DERMATOLOGY, St. John's Hospital, 49, Leicester-square, W.C.
TUESDAY, Oct. 29th.—5 P.M., Dr. K. Sibley: Principles of Treatment. Local.
THURSDAY—5 P.M., Dr. H. G. Burford: Pathology Demonstration.

NORTH-EAST LONDON POST-GRADUATE COLLEGE, Prince of Wales's General Hospital, Tottenham, N.
MONDAY, Oct. 28th.—2.30 to 5 P.M.: Medical, Surgical, and Gynæcological Clinics. Operations.
TUESDAY.—2.30 to 5 P.M.: Medical, Surgical, Ear, Nose and Throat Clinics. Operations.
WEDNESDAY.—2.30 to 5 P.M.: Medical, Skin, and Eye Clinics. Operations.
THURSDAY.—11.30 A.M.: Dental Clinics. 2.30 to 5 P.M.: Medical, Surgical, Nose, Throat and Ear Clinics. Operations.
FRIDAY, Nov. 1st.—10.30 A.M.: Throat, Nose and Ear Clinics. 2.30 to 5 P.M.: Surgical, Medical, and Children's Diseases Clinics. Operations.

WEST LONDON HOSPITAL POST-GRADUATE COLLEGE, Hammersmith, W.6.
MONDAY, Oct. 28th.—10 A.M., Dr. Dowling: Skin Department. 11 A.M., Mr. Tyrrell Gray: Surgical Wards. 2 P.M., Mr. Sinclair: Surgical Wards.
TUESDAY.—10 A.M., Medical Registrar: Medical Wards. 2 P.M., Dr. Shaw, Medical Out-patients. 2.30 P.M., Sir Henry Simson: Gynæcological Operations.
WEDNESDAY.—10 A.M., Dr. Burnford: Medical Wards. 2.30 P.M., Mr. Donald Armour: Surgical Wards. 4.30 P.M., Dr. Carter Braine: X Ray Therapy.
THURSDAY.—11.30 A.M., Mr. Simmonds: Demonstration of Fractures. 2 P.M., Mr. Bishop Harman: Eye Department. 2 P.M., Mr. MacDonald: Genito-Urinary Department.
FRIDAY.—10 A.M., Dr. Pritchard: Medical Wards. 12 noon, Dr. Shaw: Clinical Demonstration. 2 P.M., Mr. Vlasto: Throat, Nose and Ear Department.
SATURDAY.—9 A.M., Mr. Vlasto: Throat, Nose and Ear Operations. 9.30 A.M., Dr. Burnford: Bacterial Therapy Department. 10 A.M., Dr. Owen: Medical Children's Department.
Daily, 10 A.M. to 5 P.M., Medical, Surgical and Special Out-patients, Operations, Ward Visits, Anæsthetic Courses.

NATIONAL HOSPITAL, Queen-square.
MONDAY, Oct. 28th.—12 noon., Dr. Greenfield: Pathology of Nervous System. 2 P.M., Dr. Riddoch: Out-patient Clinic. 3.30 P.M., Dr. Kinnier Wilson: Syphilis of Nervous System.
TUESDAY.—2 P.M., Dr. Walshe: Out-patient Clinic. 3.30 P.M., Dr. Bernard Hart: Disorders of Memory.
THURSDAY.—2 P.M., Dr. Kinnier Wilson: Out-patient Clinic. 3.30 P.M., Mr. Just: Nervous Symptoms in Sinusitis.
FRIDAY, Nov. 1st.—12 noon., Dr. Purdon Martin: Anatomy and Physiology of Nervous System. 2 P.M., Dr. Adie: Out-patient Clinic. 3.30 P.M., Dr. Symonds: Some Infectious Diseases of Nervous System.

INSTITUTE OF HYGIENE, 28, Portland-place, W.
WEDNESDAY, Oct. 30th.—3.30 P.M., Dr. T. J. Hoskin: Heart Affections: Cause and Prevention.

ROYAL INSTITUTE OF PUBLIC HEALTH, 37, Russell-square, W.C.
WEDNESDAY, Oct. 30th.—4 P.M., Dr. A. F. Hurst: The Asthma Problem.
FRIDAY, Nov. 1st.—5 P.M., Prof. R. A. Peters: Coördinative Biochemistry of the Cell and Tissues. (Third Harben Lecture).

ROYAL ANTHROPOLOGICAL INSTITUTE.
FRIDAY, Nov. 1st.—5.30 P.M. (in the Polytechnic Hall, Great Titchfield-street, W.), Dr. G. Elliot Smith: The Evolution of Man (Public Lecture).

LONDON SCHOOL OF HYGIENE AND TROPICAL MEDICINE.
MONDAY, Oct. 28th.—5 P.M., Dr. J. S. Owens: Atmospheric Pollution.

CHADWICK PUBLIC LECTURES.
TUESDAY, Oct. 29th.—5.15 P.M. (at the House of the British Medical Association, Tavistock-square, W.C.), Prof. J. Boeke (Utrecht): The Tissues of Youth and Age.
FRIDAY, Nov. 1st.—5.15 P.M., The Nervous System in Relation to Health.

ST. THOMAS'S HOSPITAL MEDICAL SCHOOL, Albert Embankment, S.E.
TUESDAY, Oct. 29th.—5 P.M., Dr. A. St. G. Huggett: Physiology of the Fœtus. (Fourth lecture.)

CONFERENCE ON MENTAL HEALTH, Central Hall, Westminster, S.W.
WEDNESDAY, Oct. 30th.—8.30 P.M., Inaugural Meeting. Sir Maurice Craig, Dr. Letitia Fairfield, Sir Frederick Willis, Dr. F. E. Fremantle, M.P., and others. (Chairman: Lord Brentford.)
THURSDAY.—4.30 P.M., Dr. H. Crichton-Miller, and others: Sex Education. 6 P.M., Working of the Juvenile Courts. 8 P.M., Dr. Millais Culpin and Prof. Winifred Cullis: Personal Equation in Industry.
FRIDAY, Nov. 1st.—2.15 P.M., Dr. H. P. Newsholme and others: Place of Mental Hygiene in Social and Public Health Work. (Chairman Sir George Newman.) 4.30 P.M., The Child and the Parent. 8 P.M., Dr. J. A. Hadfield and others: Delinquency, A Problem in Mental Hygiene.
SATURDAY, 11 A.M., Dr. E. A. Hamilton-Pearson and others: The Problem Child at Home and in School. (Chairman: Dr. R. H. Crowley.)

KING'S COLLEGE FOR HOUSEHOLD AND SOCIAL SCIENCE, Campden Hill-road, W.
FRIDAY, Nov. 1st.—5 P.M., Prof. V. H. Mottram: Human Nutrition. (Third of six lectures.)

KING'S COLLEGE, Strand, W.C.
TUESDAY, Oct. 29th.—5 P.M., Mr. J. W. Pickering, D.Sc.: Blood Plasma and Platelets. (Fourth lecture.)
THURSDAY.—5 P.M., Mr. J. A. Hewitt, D.Sc.: Metabolism of the Carbohydrates and Fats. (Third of four lectures.

UNIVERSITY COLLEGE, Gower-street, W.C.
MONDAY, Oct. 28th.—5 P.M., Dr. R. J. Brocklehurst: Secretion of the Digestive Juices. (Third of four public lectures.)
FRIDAY, Nov. 1st.—5.30 P.M., Mr. C. S. Elton: The Future of Animal Ecology. (Second of three lectures.)

MANCHESTER ROYAL INFIRMARY POST-GRADUATE COURSE.
TUESDAY, Oct. 29th.—4.15 P.M., Mr. G. Jefferson: Concerning a Series of Pituitary Tumours.
FRIDAY, Nov. 1st.—4.15 P.M., Dr. W. Sage Sutherland: Uses of Antiscarlet Fever Antitoxin.

ANCOATS HOSPITAL, Mill-street, Manchester.
THURSDAY, Oct. 31st.—4.15 P.M., Dr. A. Renshaw: Cystological Changes in the Blood and their Significance

UNIVERSITY OF SHEFFIELD POST-GRADUATE CLINIC.
FRIDAY, Nov. 1st.—3.30 P.M., Dr. Grout: Radiological Examination of the Gastro-intestinal Tract.

Appointments.

BATES, H. T., M.B., B.Ch., has been appointed Certifying Surgeon under the Factory and Workshop Acts for the Addingham District of the County of York, West Riding.
CLARK, R. J., M.B., Ch.B. Aberd., D.P.H., Medical Officer of Health, Cheshire.
POTTS, T. N. V., M.D., B.S. Durh., D.P.H., Medical Officer of Health to the West Riding County Council.
SHARMAN, ALBERT, M.B., Ch.B. Glasg., Extra-Surgeon, Out-patient Department, Royal Samaritan Hospital for Women, Glasgow, to a McCunn Research Scholarship in Gynæcological Surgery.

Vacancies.

For further information refer to the advertisement columns.

Adelaide University.—Elder Professor of Anatomy and Histology. £1100.
Barnsley, Beckett Hospital and Dispensary.—Jun. H.S. £140.
Bath, Royal United Hospital.—Asst. H.S. At rate of £100.
Bedford County Hospital.—Asst. H.S. At rate of £130.
Bethnal Green Hospital, E.—Asst. M.O. £350.
Birmingham City.—M.O. for Maternity and Child Welfare. £600.
Birmingham General Hospital.—H.P. £70.
Bolton, Townleys Hospital, Farnworth.—Second Asst. M.O. £225.
Bradford Royal Eye and Ear Hospital.—Jun. H.S. £150.
Bradford Royal Infirmary.—H.P. £150.
Brighton, Sussex Maternity and Women's Hospital.—Res. H.S. £130.
Cambridge, Physiology School.—George Henry Lewes Studentship in Physiology. £250.
Cancer Hospital, Fulham-road, S.W.—Part-time Research Radiological Asst. 1 gn. each attendance. Also H.S. At rate of £100.
Cardiff, Glan Ely Tuberculosis Hospital, Fairwater.—Asst. Res. M.O. £250.
Carlisle, Cumberland Infirmary.—H.P. At rate of £155.
Central London Throat, Nose and Ear Hospital, Gray's Inn-road, W.C.—Asst. S.
Charing Cross Hospital, W.C.—Hon. Clin. Asst. for X Ray Dept. Also Res. M.O. £350.
Chester Royal Infirmary.—H.S. £120.
Coventry and Warwickshire Hospital.—Res. H.P. £160.
Derby, Derbyshire County Sanatorium, near Chesterfield.—Res. Asst. M.O. £350.
Dewsbury County Borough.—M.O.H. and School M.O. £900.
Dover Borough.—Asst. M.O.H. £700.
East Ham County Borough.—Deputy M.O.H., &c. £700.
Evelina Hospital for Children, Southwark, S.E.—H.P. At rate of £120.
Exeter, Royal Devon and Exeter Hospital.—H.S. to Special Depts. At rate of £130.
Gloucester, Gloucestershire Royal Infirmary.—Second H.S. At rate of £100.
Gravesend and North Kent Hospital.—Jun. H.S. At rate of £80.
Great Yarmouth General Hospital.—Jun. H.S. £125.
Hospital for Sick Children, Great Ormond-street, W.C.—Res. M.O At rate of £250.
Hospital of St. John and St. Elizabeth, 60, Grove End-road, N.W. Res. H.P. At rate of £100.
Hull Royal Infirmary.—Hon. Ophth. S.
Italian Hospital, Queen-square, W.C.—Res. M.O. At rate o £150.
Jersey General Hospital, &c.—Res. M.O. £200.
Kingston-upon-Hull City and County.—Asst. M.O.H. £600.
Leicester, Leicestershire County Council.—Asst. County M.O.H. £650.
Liverpool, Alder Hey Children's Hospital, West Derby.—Res. Asst. M.O. £200.
Liverpool County Borough.—Jun. Asst. Sch. M.O. £600.
London Hospital, E.—Dental Anæsthetist.
London Jewish Hospital, Stepney Green, E.—Hon. Asst. Radiologist.
Manor House Hospital, Golders Green, N.W.—H.S. At rate of £200.
Middlesex Hospital and Medical School, W.—Medical and Surgical Registrar. £300.
Miller General Hospital, Greenwich-road, S.E.—Orth. H.S. At rate of £150. Hon. Surg. Also Hon. Physician to Skin Dept.
Northwood, Mount Vernon Hospital.—Asst. Pathologist. £500.
Nottingham General Hospital.—Second Cas. O. At rate of £150.
Oldham, Poor-law Institution, Rochdale-road.—Res. Asst. M.O. £200.
Plymouth City.—Asst. M.O.H. for Maternity and Child Welfare Dept. £600.
Portsmouth Royal Hospital.—Sen. H.S. At rate of £175. Also H.P. and two H.S.'s. Each at rate of £130.
Prince of Wales's General Hospital, Tottenham, N.—Hon. Med. Reg.
Queen's Hospital for Children, Hackney-road, E.—Clin. Asst. for Orthopædic Dept. 5s. each attendance. Cas. O. £100. Also Surgeon to Ear, Nose and Throat Dept.
Redhill, Surrey, Royal Earlswood Institution.—Jun. Asst. M.O. At rate of £250.
Royal London Ophthalmic Hospital, City-road, E.C.—Surgeon to Ear, Nose and Throat Dept. Also Out-patient O. £100.
Royal Naval Dental Service.—Dental Officers.
Royal Society, Burlington House, W.—Foulerton Research Student. £700.
St. Mark's Hospital for Cancer, &c., City-road, E.C.—Clin. Assts.
Sheffield City Hospitals, Infectious Diseases.—Res. M.O. £350.
Sheffield University, Faculty of Medicine.—Lecturer in Pathology. Also Demonstrator in Pathology. Each £500.
Southern Rhodesia Government.—Director of Public Health and Medical Services. £1750.
Stroud General Hospital.—H.S. At rate of £125.
Swanley, Kent, Alexandra Hospital for Children with Hip Disease.—Res. Asst. M.O. At rate of £300.
Walsall General Hospital.—Sen. H.S. Also H.S. At rate of £200 and £150 respectively.
West End Hospital for Nervous Diseases, Welbeck-street, W.—Hon. Asst. Physician.
Weymouth and District General Hospital.—H.S. £180.
Windsor, King Edward VII Hospital.—Hon. Asst. S.
Worcester General Infirmary.—Sen. Res. M.O. £180. Also Jun. Res. M.O. £120.

The Chief Inspector of Factories announces vacant appointments for Certifying Factory Surgeons at Ammanford (Carmarthen) and Milborne Port (Somerset).

Births, Marriages, and Deaths.

BIRTHS.

ADDISON.—On Oct. 18th, at Wilbraham-place, S.W., the wife of Dr. G. M. Addison, of a daughter.
FARMAN.—On Oct. 7th, at Haverstock-Hill, N.W. the wife of Dr. Noel B. Farman, of a son.
MATHEWS.—On Oct. 14th at Kirkby Lonsdale, the wife of R. G. Mathews, M.B., B.Ch., of a son.
REICHWALD.—On Oct. 20th, at Timber Hill, Ashtead, Surrey, the wife of Dr. M. B. Reichwald, of a son.

MARRIAGES.

BARNES—NEWMAN.—On Oct. 16th, at St. Philip's Church, Kensington, Warren Alston Barnes, M.B., B.Ch., to Helen Newman, M.B., B.S., elder daughter of the Rev. and Mrs. Herbert Newman, of Stone, near Ashford.

DEATHS.

BEVAN-LEWIS.—On Oct. 14th, William Bevan-Lewis M.Sc., L.R.C.P., M.R.C.S. Eng., of Priory-street, Cardigan, aged 82 years.
LEE.—On Oct. 15th, at "Sainssoins," Little Shelford, Cambridge, Crichton Stirling Lee, M.R.C.S., L.R.C.P., aged 50.
ROUSE.—On Oct. 14th, suddenly, at Monte Carlo, Rolla Edward Rouse, M.D., in his 70th year.

N.B.—A fee of 7s. 6d is charged for the insertion of Notices of Births, Marriages, and Deaths.

Notes, Comments, and Abstracts.

THE HEALTH AND CONDITIONS OF WORK OF MEDICAL STUDENTS.*

By E. GRAHAM LITTLE, M.D., F.R.C.P., M.P.,
PHYSICIAN IN CHARGE OF THE SKIN DEPARTMENT AT ST. MARY'S HOSPITAL.

I. Health.

My choice of subject was dictated by the consideration that I gave the corresponding inaugural lecture last year upon the Health of the Doctor, and it was suggested to me that an inquiry into the health of the embryo doctor might be useful. I was filled with consternation, however, when I began to come to grips with the subject, at the nearly complete absence of any data, which had been quite abundantly present in the case of the Health of the Doctor, as there is a well-defined category of statistics concerning the health of general practitioners in the compilations of the Registrar-General's Office, but there is no category of medical students.

Sir James Paget's Analysis.

The only direct reference to the subject which I have been able to find is a very short paper by Sir James Paget, published in St. Bartholomew's Hospital *Reports* for 1869. Paget there considered the question under the heading, What Becomes of Medical Students? and his inquiry is not entirely limited to the stage of pupilage, nor is the chief attention given to the health of the persons considered so much as to their achievement. But out of a round number of a thousand of his own pupils whom he thus passes in review, 41 actually died during pupilage, 15 failed to qualify, and 96 relinquished the profession after beginning either its study or its practice. Of the 41 who died, 17 are recorded as suffering from tubercle and 2 committed suicide. It is interesting to note that 87 died after beginning practice, one of whom was hanged for murder, the notorious Palmer of Rugely, who, Paget remarks caustically, "was an idle, dissipated student, cursed with more money than he had either the wisdom or the virtue to use well." Paget began his paper with the remark that he was not aware that any attempt had been made previously to answer his question, and I have been unable, as I have said, to find any reference to the matter I am now considering since Paget wrote. I am hopeful, therefore, that the subject will not at any rate be a hackneyed one.

In the last annual report of the Ministry of Health (June, 1929) the statement is made that the sum estimated for the current year as being required to carry out the service of that Ministry is not less than £23,028,000, a sum which is nearly a million more than for the previous year. The value of these services rests almost entirely upon the fitness of medical men and women to perform the duties required, and the preparation of the army of practitioners who will be called upon to execute these functions becomes a matter of considerable public importance. When one considers the enormous increase in the complexity of the education of the medical student since Paget's time, and notably the extension of the actual duration of his training, one would perhaps surmise that the mortality of students, both as regards their relinquishing the profession as well as being invalided or dying out of it, would be materially increased.

Inquiry of Deans of Medical Schools.

Unhappily, it has been extremely difficult to get any reliable information upon these points. As a preparation for this paper I sent out a letter to the deans of all the principal medical schools in the British Isles, and I have received a large number of replies, which I shall roughly analyse. (1) A preponderant number replied that they had no data, and could not obtain them. (2) A considerable number replied that, while furnishing no actual figures, the writers were convinced that the mortality from illness amongst medical students was very small, quite a curious consensus of opinion placing it as "about 1 per cent." More definite information has been supplied by two schools, Leeds and St. Mary's Hospital. The following letter from the Dean of the Medical School of Leeds is reproduced with his permission.

Health of Medical Students at Leeds.

"I can only speak," he writes, "in general terms. Before the war I noted that the mortality or disability from tuberculosis was about 5 per cent.—i.e., about one each year, in an entry of 20. I do not remember any other cause of withdrawal. We lost no student by infectious disease or abdominal trouble, and certain cases of death from pneumonia occurred in students who had withdrawn for other reasons.

"Since the war there have been very few cases of tubercle, and some deaths from influenza and cerebro-spinal meningitis not to be attributed to the line of life. I have attributed the decrease of tubercular cases to the better conditions of student life, as all lodgings must be inspected and registered, and the facilities for outdoor exercise have increased vastly. Daylight saving and the decrease of monkeying about town in the evening may have had an influence, but it has to be noted that the tubercular cases pre-war occurred usually in students of very orderly lives in that respect.

"The student of the present day spends far more time out of doors, and I note that there is much less difference in his condition at the beginning and end of terms than there used to be. In pre-war days the student had little recreation without much trouble in transport. Now he can work in a game of tennis all the year round, or a game of golf, instead of crawling out to a pub. with a billiard table."

Withdrawal of Students at St. Mary's Hospital, London.

The following statistics have been prepared from a list of some 460 entries to St. Mary's Hospital Medical School between 1917 and 1924, the number of men and women students being approximately the same.

Number of students who, having entered upon a medical course, fail to qualify .. .. 9·3 per cent.
(Men, 13·5 per cent; women, 5·1 per cent.)

Number falling out at the various stages of the curriculum—
(*a*) Before completing the first exam. .. 4·9 per cent.
(Men, 7·6 per cent.; women 2·2 per cent.)
(*b*) Before completing the second exam. .. 1·7 per cent.
(Men, 2·5 per cent.; women, 0·9 per cent.)
(*c*) After completing the second exam., and before becoming qualified .. 2·7 per cent.
(Men, 3·4 per cent.; women, 2·00 per cent.)

Reasons for Withdrawal.

Men.—Of the 32 withdrawals dealt with during the above eight years, the following were the causes so far as can be ascertained.

(1)	Ill-health	5
	(Lung trouble, 2; shell shock, &c., 2; mental, 1.)	
(2)	Financial difficulties	6
(3)	To take up good business openings	2
(4)	Failure to take an interest in the work	8
(5)	Suspended for misconduct	2
(6)	Uncertain (but not ill-health)	9

Women.—(12 withdrawals).

(1)	For the purpose of being married	6
(2)	Personal ill-health ("lung trouble")	1
(3)	Illness of relations	1
(4)	Suspension for unsatisfactory work	2
(5)	Uncertain (not ill-health)	2

It will be seen from these records that tubercle still seems to head the list of causes of death or withdrawal amongst medical students, and it is of some significance in this connexion to note the reply from Guy's Hospital, in which the statement is made that two house officers during the last five years were obliged to give up their appointments on account of tubercle. In only one reply has suicide been mentioned as a cause of death.

Comparison of English and American Systems.

The strenuous character of the present-day training of medical students, a training which involves very hard and continuous study for an average period of seven years between the entrance examination and qualification, marks out medical students as a class apart, and perhaps justifies my considering this question from this limited point of view. We have practically no statistics in this country of the health of students in general, but a considerable volume of literature from American sources upon this subject is now available, to which I shall refer in a few minutes. Health Education Service, as this has come to be named, forms a very important part of the administration of American universities and schools, and one cannot but regret that the subject has received no attention in this country where haphazard methods still rule. The American student nowadays is very carefully "vetted" before he is allowed to come to college, still more carefully examined for his physical fitness to undertake an industry or profession, and most severely of all for his suitability to enter upon arduous athletic exercises.

It will perhaps be contended that our system, which is lacking in all these features, succeeds by survival of the fittest, but this is surely a somewhat expensive and unscientific method of dealing with the circumstances involved. To wait, as is sometimes recommended by shortsighted observers, for treatment until the individual feels ill, which is still too much the habit with our people, is both unscientific and desperately uneconomical. Most sensible persons nowadays make a point of visiting their dentists two or three times a year, even in the absence of symptoms of

* An address given at the Royal Institute of Public Health on Oct. 16th, 1929.

toothache; and the same precautions should obviously be followed in other departments of medical practice. It is, I think rightly, contended by the advocates of the American careful methods of examination at college that the young people who have been through this mill become apostles of health and spread far and wide more scientific conceptions as to the care of mind and body than prevail amongst those not so instructed, and a still further ultimate advance in the high standard of health amongst the American population may be confidently anticipated. The American universities, where co-education is the rule, also supply some data on the relative resistance of men and women to wear and tear of training for professions generally. In our schools, where co-education is much more recent and on a very much smaller scale, no sufficient data are available.

The time is ripe, I think, for a consideration on broad lines of the health of students in general, both in secondary schools and in universities, and it is an anomalous fact that his consideration is given very meticulously in the secondary schools which are under State or municipal control but hardly at all in the great public schools of the country and in the universities, both of which categories are under voluntary management as distinguished from State or municipal management. There is no brighter outlook for the operation of preventive medicine than in this particular function of watching over the health of the adolescent and the young adult. The results obtained from the care given by the State to this function are so encouraging as to force upon us the conviction that medical watchfulness should be exercised in all departments where young people are undergoing a community education, whether at the expense of the State or of the individual. Some interesting comparisons have been made of the physique of public school boys as compared with boys attending State schools, and hitherto the comparison has been in favour of the public school boy who obviously starts with greater advantages, coming as he does from well-to-do households as compared with relatively poorer surroundings. But the later examinations are more and more proving that the State-educated adolescent is fast catching up, and even surpassing, the public school boy in this matter of physique. That some of the conditions of life at public schools require radical alteration was borne in upon me by a recent professional experience. I was consulted about an outbreak of body ringworm in an old-established house at one of the greatest and most famous of our public schools. The house contained 40 boys, all of whom were found to be infected, and the matron and housemaster, whom I interviewed, admitted that it was the rule, owing to the paucity of bath rooms in an old-fashioned house, for ten boys to use the same water one after another, and the promiscuity which such conditions inevitably engender very amply explains the overwhelming character of the epidemic in that particular house.

American Health Service.

The care taken by American colleges in sifting students before entry has no counterpart in this country, and I submit that we have much to learn from American methods. Although the American Health Service, as it is called, is of comparatively recent establishment, some valuable data have already been afforded. It is interesting to note that the principle was in the first instance initiated nearly half a century ago by the enterprise of some women investigators who were concerned to find that women students compared unfavourably in health conditions with men, and proceeded to ask why. Periodical medical examinations and careful "vetting" of women students began at once to make a difference so perceptible that the men copied the idea. Very much of the high health standard of the American people is due to the coöperation and intelligent watchfulness of women who, during the last 30 years, have learned from their college days to busy themselves as housewives, with the nutritive value and the purity of foodstuffs, and by unity of action through the agency of leagues or unions of consumers throughout the country have been able to insist upon the supply of better food. To quote one item only, the quality of American milk is immeasurably better than the quality of milk sold in this country, and I understand that probably as a result glandular tuberculosis is non-existent in the United States.

These health services have spread all over the colleges of the United States. Here are some examples of what is done. At a great industrial college in the United States inquiries are made of intending applicants for entry (1) whether the applicant should come to college at all; (2) what form of industrial occupation he may be physically fitted to undertake if admitted; (3) how he may improve his physical condition so as to make the most of his opportuities both in industry and at college; and searching inquiries upon these subjects are made through the medium of family practitioners, whose coöperation is usually readily obtained. Several interesting facts have become apparent from a study of these American statistics. In a prominent women's college, for example, the unexpected finding was that women students tended to show an actual deterioration of health during college life as compared with the men in a similar college. The figure quoted states that the women dropped 16 per cent. while the men gained 6 per cent., a contrast explained by the writer as being due to the women taking their work too seriously, and he forms the pessimistic axiom: "the higher the intellectual attainment in the subjects of health and disease, the lower seems the health intelligence. The greater the theoretical knowledge of health, the poorer seems the practice."

Another index to the value of leisure and healthy exercise is afforded by a comparison of the health of self-supporting students, that is to say, students who maintain themselves by other occupations during their study, a feature much more common in American than in British colleges. The health of students thus working overtime, as it were, compared unfavourably with the health of students who were not so handicapped, and illness in women of this class was more than twice as large as in men of the same class.

University of Minnesota.

In the University of Minnesota, with a student body of 10,000, of whom about half are stated to live at home, the health service is a very elaborate and important part of university administration. Its expenses are partly met by a compulsory fee exacted from each student, constituting about half of the actual expense of the service. The completeness of provision for overhauling disease actually provided in this University[1] is indeed remarkable. A very efficient medical service on a part-time basis has been developed and is under the direct control of the President of the University through a subordinate officer called the Director of the Health Service. The examinations conducted by this service include entrance physical examinations, periodic health examinations, and special physical examinations. Defects and abnormalities which are discovered by the entrance examinations are followed up during the school year with remarkably beneficial effects in a series of departments, such as general medicine, eye, ear, throat, &c. An improvement in defects averaging 60 per cent. was noted. Special physical examinations are exacted of students who wish to participate in athletics, and the American student is thus very thoroughly "vetted" for the particular form of athletics which he may wish to practise. An extensive out-patients' service forms part of the machinery of defence against disease, and ample provision is made for infirmary treatment, the compulsory fee covering a certain measure of infirmary treatment every year. Vaccinations, immunisations, immunity tests, are extensively used. One of the most important and typical of the measures taken in this service is the careful watch kept upon nutrition; observation is made of the student's diet, and his habits of eating, sleeping, recreation, worry, work, &c. The provision of medical services upon the spot naturally effects a great saving of time, and the accessibility of the departments may be gauged by the use which the students make of them. For example, during the year 1925–26 about 1800 students made 8772 visits to health departments, exclusive of the entrance dental examination which is one of the largest departments in the University. The number of hours per week actually given by the medical staff is comparable to the service at a great teaching London hospital.

University of Cornell.

Another valuable contribution is in a paper[2] upon the organisation of health education at Cornell University, New York, by the medical adviser, Dr. D. F. Smiley, who states that for the last three years each entering class at Cornell University has shown progressively fewer physical defects and faulty health habits than the preceding class. The means adopted at Cornell University are very fully detailed in this paper, and the sense of responsibility towards the students entertained by the University authorities is clearly very much better developed than it is with us. There can be no question also that, as Dr. Smiley remarks, these inquiries furnish the most admirable opportunities for research in the field of health-education amongst students in general, and should furnish also data for estimating the incidence, and perhaps the causes, of numerous minor disorders—colds, glycosuria, the effect of exercise upon minor abnormalities of the heart and vessels, &c.

The actual institution of these services at Cornell dates from 1919, so that they have now had ten years working of the full programme, but hygiene had been a subject of instruction at Cornell since its foundation in 1868. The department is under the control of a committee of four members appointed by the President of the University who retains a coördinating control. It is operated by

[1] Journal of Preventive Medicine, 1927, p. 377.

[2] Public Health Reports (U.S. Public Health Service), 1926, 2631.

physicians, and it has been found that full-time physicians are preferable to part-time physicians; that men physicians are preferable for men, and women physicians for women; that young physicians are better than old ones; and practical experience has shown that there is enough work to employ one physician for every 500 students, and it is hinted that this proportion must be soon increased. The activities of the Department of Hygiene are described under five headings: (1) health examination; (2) medical consultation; (3) communicable disease control; (4) health education; (5) research. Every undergraduate and every entering graduate is required to have annual physical examination. No athlete is permitted to represent the University on an athletic team without having qualified for and procured a certificate from the medical adviser's office. Medical services are open daily from 9 A.M. to 6 P.M., and something like 25,000 voluntary consultations are recorded per year. Each student pays $5 a term for the services, which includes the free use of the University infirmary in cases requiring bed-treatment.

The value of this method is demonstrated by the experience of an epidemic of influenza occurring in the year in which the report was written. Early treatment, rendered practicable by these conditions, of 658 cases of influenza resulted in keeping the incidence of pneumonia after influenza to less than 1 per cent. of the total number of cases, an incidence which compares very favourably with the usual statistics of influenza. These careful measures further allow of the compilation of extremely useful statistics. Lost time during the year amongst 3724 men students was 1·1 per cent., and amongst 1173 women it was 1·8 per cent., figures which compare favourably with an earlier inquiry at Cornell by Dr. Emerson in 1919–20, when the loss of school hours was for the men 1·5 per cent. and for the women 2·4 per cent., and this is notwithstanding the disturbance of the statistics occasioned by the very severe influenza epidemic in 1926.

The Life Extension Institute.

The actual monetary value to the State of the improvement in the health of individual citizens resulting from periodical medical inspection is demonstrated in a series of papers contributed by experts in life insurance, a subject much more carefully and scientifically studied in the States than here. A group of men prominent in American public life, including Surgeon-General Gorgas of Panama fame, ex-President Taft, Dr. Fisk, and Dr. Ley, in 1914 started a scheme of periodical health examinations conducted under the auspices of an institution founded by the group and called the Life Extension Institute. The services of this body were taken advantage of in the first instance by the great insurance company, the Metropolitan Life Insurance Company of New York, and a very significant review of the results obtained after six years' experience is contributed by Dr. Storey. During that period the company had medically examined on this system of periodical examinations about 6000 people at a cost of $60,000, and had gained, through the premiums of persons whose lives had been extended as a result of these examinations and the correction of minor defects, no less a sum than $120,000; the company had thus made 100 per cent. on its investment, and its example was speedily followed by numerous other insurance companies, so that it is stated that the Life Extension Institute has examined over half a million patients since its inception. A consideration of nine years' operation of these services showed a reduction of 18 per cent. in the death-rate of policy-holders affected, and amongst a group of impaired lives a reduction of over 50 per cent. in the death-rate. With the typical American business grasp, in another paper the capital value of this improvement in health is carefully assessed and set out. The money-equivalent of this improvement is estimated at no less a sum than 3450 million dollars in the year 1924. The figures are based on the estimate of the value of the individual to his or her family or dependents, and upon this basis the curious comparison is made that while in 1922 the material assets, other than this human capital, in the United States was 321,000 million dollars, the human capital upon the principle just described was, in 1924, nearly five times as great, and the business value of this system of health service is thus very abundantly demonstrated.

II. Conditions of Work.

With regard to the conditions of work of medical students, which is the second title of my paper, these have changed so radically, even since the time of Paget, as to make comparisons difficult between the present-day conditions and those of earlier years. Unhappily the transcendent genius of Dickens has stamped his presentation of medical student life in the persons of Bob Sawyer and Ben Allen upon the minds of successive generations as being typical of medical student life in general. Even in Dickens's day this picture must have been a caricature, and no other picture has been drawn upon the same subject with any distinctiveness or force since he wrote the immortal "Pickwick." With the exception of some slight sketches by Conan Doyle the medical student does not seem to have figured since that date in English literature. The preparation for the profession of medicine has become so arduous and so absorbing that the medical student is kept to the grindstone very completely throughout the long seven years which form the average period of study. Nevertheless, it has become apparent from a study of the meagre statistics available that health conditions have improved very considerably, even in England. Housing of medical students, though still too little thought of, is immeasurably better, especially in the case of the big towns. As mentioned, the Dean of Leeds University regards the improvement under this heading as being largely responsible for the better general health of medical students noticeable even since the war.

The life of the medical student in the London schools differs very considerably, and must differ, from that of the fortunate student at the older residential universities. It is one of the disadvantages of the excellent training given in London that the student is restricted to intercourse with his own fellows and is not, as at a university, very easily able to mix with students of other faculties. This restriction, while mischievous in some respects, engenders in the student an extraordinarily ardent, if narrow, patriotism for the school at which he has been educated. To a member of a London school, such as Guy's or St. Bartholomew's, his hospital and all its interests acquire almost the force of a religion, and the friendships made in this narrow environment are often lifelong and abiding. Indeed, it is something of a reproach that there is so little understanding of or sympathy with other schools on the part of the students of one school. A rigid favouritism is apt thus to grow and to be reflected in the phenomenon that it is seldom that the choice of members to fill vacancies on the staff goes outside the magic circle of the school, a condition of things which is happily breaking down at present under the stress of new university appointments, now made by the University of London, with the financial help of the University Grants Committee.

Study and Relaxation.

With the drive exercised by the necessity of passing an ever-increasing number of increasingly difficult examinations the conditions of pupilage have changed very notably. It is no longer possible, as it was when I was a student, for a man to remain, as one of my fellow-students actually did, at his hospital for more than 18 years, at the end of which period he had not taken his first qualification. Much more control is exercised now upon the work of the student, and the incorrigibly idle or incompetent student is asked to leave his hospital after a certain period of probation if he should have failed to mend his ways. It is not surprising that with so persistent and so harassing a study the need for relaxation in sport and other outlets for energy is greater in the case of the medical student than perhaps in the case of any other class, and the cultivation of athletics has almost gone beyond reasonable limits in many medical schools, where the prizes of resident appointments are often given more for athletic prowess than for academic distinction. The rebound of the medical student from close application is sometimes a little exuberant, as for example in the regrettable incidents which recently attracted the notice of the London police-courts when medical students disturbed the proceedings of an antivivisection meeting. But the astonishing sobriety and restraint of medical students of the present day as a class offers indeed a sufficient contrast to the attitude of mind depicted by Dickens, and to the general conception of medical students still prevailing with a large number of people.

Medical study has become in our own generation completely transformed by the advance of medicine in its scientific outlook. With the immense increase of scientific discoveries new subjects have been continually added to the curriculum, and at the present moment the medical student has to be "signed up," as it is called, that is, certified as having attended, classes in something like 40 subjects. There seems to be no finality in this accretion, and it has long been obvious that certain changes are necessary in the preparation of the student. The period of study, which now approximates to seven years, cannot well be extended; some rearrangement of subjects must therefore come about. The present duration of the training requires so large an expenditure of time and money, both on the part of teaching schools and of students, that the profession of medicine is becoming more and more restricted to those who start with considerable private means and who enjoy an unusual degree of vigour and ability, and doubtless

this latter feature accounts for the relatively small mortality; the student is a picked student from the beginning.

Numbers Seeking Entry.

It is interesting to note the variation in numbers seeking entry into the profession. Thirty years ago the average entry in the British Isles had been about 1800. It dropped during the next decade and a half to something like 1400. During the war the wastage of doctors and the demand for their services at the Front led to a somewhat unnecessary alarm on the part of the public that the profession might become dangerously depleted, so that by the end of the war the entry approximated 2250, and for two or three years after that date even exceeded this number, the peak figure being 3420 in one year (1919). During the past five years the entry has stood round these figures: 1043, 1070, 1260, 1214, 1363. With the exaggerated entry following upon the war, the number of new practitioners registering each year has greatly exceeded the pre-war figures, so that in 1928 the number of medical men upon the Register was actually 10,000 more than in 1918, and 20,000 more than in 1898. It may be said shortly that the number of registered practitioners up to the end of the first quarter of the present century was almost exactly double the number 50 years ago, but the population of Great Britain and Ireland in that period has not increased by more than about 50 per cent., so that the increase of population has been very much less than the increase of medical practitioners has been, and the ratio of doctors to population is much higher than before.

Much of the increase has been absorbed by the rapidly increased demands of public health work, and there is considerable prospect of these demands increasing and not diminishing; but it is clear that the medical profession, if not actually overstocked at the present time, runs some risk of being so. However, the prospect of obtaining work after so prolonged a preparation for it may, at the present moment, be said to be on the whole favourable. Much discussion has taken place during the past year as to the position of medical women, whose entry during the war years was disproportionately large as compared with men. Evidence is somewhat conflicting, but my personal impression, founded upon reliable data, is that a far larger number of medical women are earning a sufficient livelihood by medicine than the pessimists allow.

Prospects.

Whatever may be the future of the medical student, there can, I think, be little question that his training is now so far-reaching, so catholic, and so well selected, that the student who receives a medical training is thereby fitted for his life's struggle in any direction, more completely than any other member of the community. The success of medical students who forsake medicine and undertake other pursuits or professions corroborates this statement. Indeed it may be said that the medical man of to-day has much the best general education of any member of the community, professional or otherwise, and the rôle of the priest in the Middle Ages, when the priest was the only educated person amongst his fellows, is becoming transferred to the doctor, with repercussions both upon the doctor and upon the public which are producing some curious effects at the present moment. The desire and the search for health have become greatly extended; a much wider proportion of the people are actively interested in these questions, and at the same time woefully ignorant upon them. The function of educating this eager public has been assumed largely, not by instructed members of the medical profession, but by irresponsible and mostly anonymous newspaper writers, and there is considerable demand for an alteration of this state of affairs, a demand which is still difficult to supply; this is a problem which many leaders of the medical profession are considering at the present moment.

State Control.

All the political portents go to show that there will be an ever-widening provision of State medical service, which now absorbs more than 17,000 members of our profession, and many observers think the time is approaching when all the medical services will be State-controlled. The body entrusted with the inspiration and guidance of medical education, the General Medical Council, has been subjected to severe and usually ill-informed criticism, and in response to a certain clamour, Parliament added two or three years ago a lay member to the composition of that Council, which, by the force of circumstances and not by design, had become restricted to professional men. The admirable choice was made of Sir E. Hilton Young, M.P., who recently told me that he has been very favourably impressed, perhaps rather contrary to his expectation, by the judicial wisdom, more especially in its much criticised disciplinary function of the General Medical Council. A comparison of the status of the medical profession before and after the foundation of the General Medical Council must convince any impartial observer of the enormous value of its services in the half century during which it has been in existence. A very beneficent and recent activity of the Council has been its insistence upon better training in preventive medicine, an aspect of that art which is becoming more and more valuable. With the increased competition brought about by the large increase in members of the profession, there has been an increasing demand for the possession of university degrees as distinct from qualifications of licensing bodies not enjoying university status. There are now 11 universities in England and Wales with fully developed medical faculties, and the University of London alone comprises in its medical faculty no less than 12 distinct and competing medical schools. Some 20 years ago the medical schools were able to persuade the University Grants Committee that medical education as a technical subject was eligible for block grants from the Exchequer, and these subventions have become one of the main elements in promoting the stability of the schools. Perhaps, naturally, the grant-giving bodies at first sought to eliminate what they deemed the weaker schools, especially in London, but notwithstanding considerable pressure to this end, all the 12 schools have survived, and the competition is all to the good in ensuring an increasing effort to improve the conditions of life and opportunities of training of medical students. It may, I think, be said with confidence that the London medical schools generally enjoy a higher reputation at the present time than in any other within living memory.

Littré's Definition.

Fifty years ago Littré, in his great dictionary, gave a definition of medicine which showed an uncanny foresight of its present developments. He described medicine as "the art which has for its purpose the preservation of health and the cure of disease, and which rests upon the study of the science of disease, or pathology." The preservation of health, which Littré thus placed first, rather than the cure of disease, has become the absorbing motive of medicine within the last few years, and the function of the doctor in promoting the preservation of health has made him perhaps the most valuable artificer of the fortunes of our present-day civilisation.

INFECTIOUS DISEASE IN ENGLAND AND WALES DURING THE WEEK ENDED OCT. 12TH, 1929.

Notifications.—The following cases of infectious disease were notified during the week:—Small-pox, 131 (last week 97); scarlet fever, 3060; diphtheria, 1582; enteric fever, 104; pneumonia, 869; puerperal fever, 50; puerperal pyrexia, 115; cerebro-spinal fever, 7; acute poliomyelitis, 29; encephalitis lethargica, 18; dysentery, 7; ophthalmia neonatorum, 100. No case of cholera, plague, or typhus fever was notified during the week.

The number of cases in the Infectious Hospitals of the Metropolitan Asylums Board on Oct. 15th–16th was as follows:—Small-pox, 166 under treatment, 3 under observation (last week 141 and 4 respectively); scarlet fever, 2263; diphtheria, 2069; enteric fever, 39; measles, 166; whooping-cough, 157; puerperal fever 30 (plus 14 babies), encephalitis lethargica, 125; poliomyelitis, 6; "other diseases," 20. At St. Margaret's Hospital there were 23 babies (plus 13 mothers) with ophthalmia neonatorum.

Deaths.—In the aggregate of great towns, including London, there was no death from small-pox, 6 (1) from enteric fever, 11 (2) from measles, 4 (1) from scarlet fever, 21 (3) from whooping-cough, 41(3) from diphtheria, 186 (49) from diarrhœa and enteritis under two years, and 29 (3) from influenza. The figures in parentheses are those for London itself.

The deaths from diarrhœa are on the wane, the highest figures being reported from Birmingham and Liverpool, each 14, Hull 13, Sunderland 8, Middlesbrough 6, while Glasgow, Dublin, and Belfast reported 9, 9, and 4 respectively. The deaths from enteric fever were reported from Brentford and Chiswick, Portsmouth, Huddersfield, Halifax, and Newcastle-on-Tyne, each 1.

The number of stillbirths notified during the week was 274 (corresponding to a rate of 42 per 1000 births), including 54 in London.

QUEEN CHARLOTTE'S MATERNITY HOSPITAL.—On Monday, Nov. 4th, Princess Louise will lay the foundation-stone of the first block of the new Queen Charlotte's Hospital in Hammersmith.